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TRANSACTIONS

OF THE

HORTICULTURAL SOCIETY

OF

LONDON.

SECOND SERIES.

VOL. III.

MDCCCXLIII.—MDCCCXLVIII.

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1848.

Vol. III. Part I.

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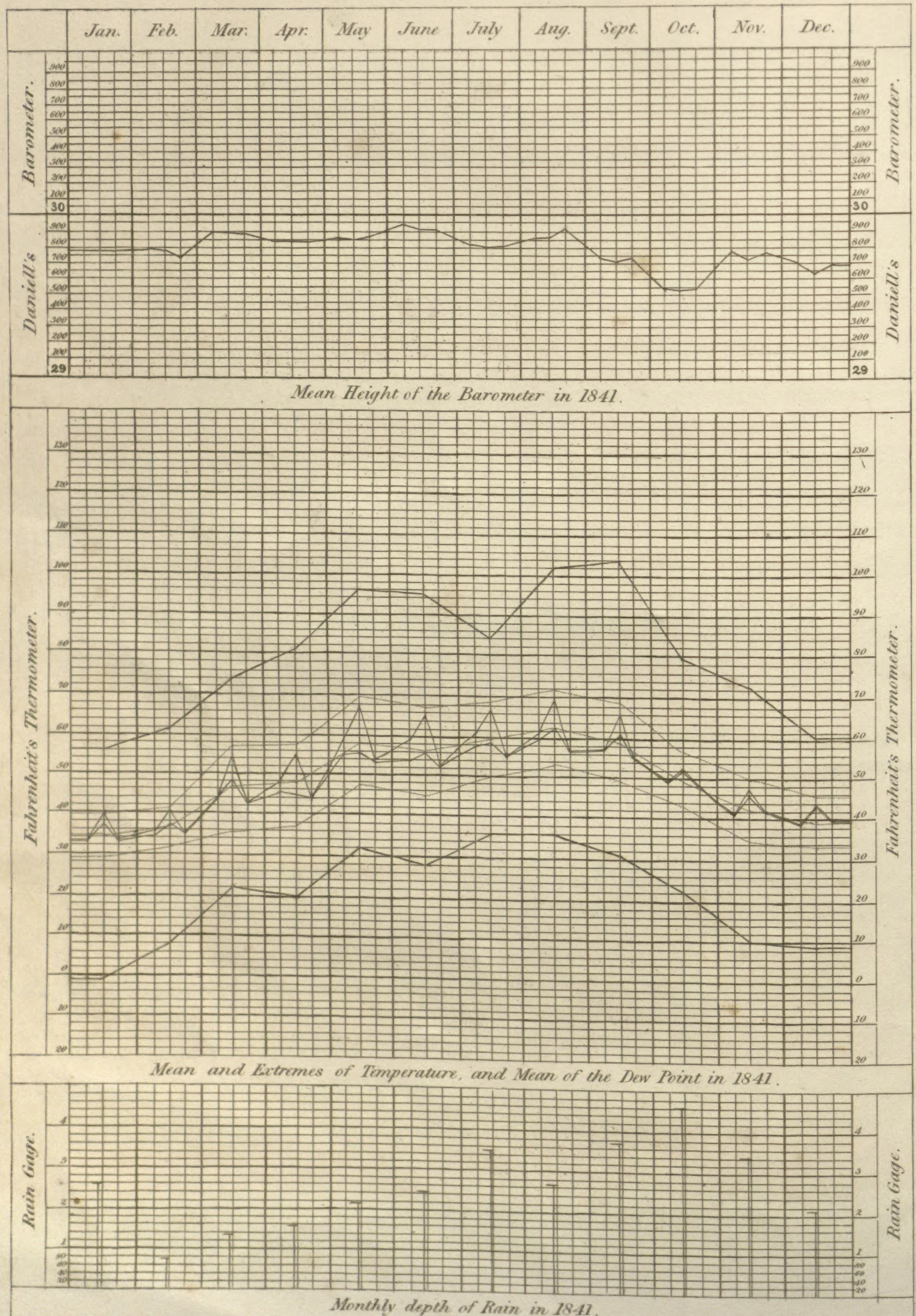

Mean Height of the Barometer in 1841.

Mean and Extremes of Temperature, and Mean of the Dew Point in 1841.

Monthly depth of Rain in 1841.

I. *Journal of Meteorological Observations made in the Garden of the Horticultural Society at Chiswick during the year* 1841. *By Mr.* Robert Thompson.

This Journal has been kept on the same plan as the preceding.

JANUARY.

1841.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
F.	1	29.942	40	40	—	Hazy	29.917	44	43	1	Fine	29.882	42	42	—	Cloudy & fine
S.	2	30.073	36	36	—	Clear	30.086	43	40	3	Ditto	29.816	38	38	—	Ditto
S.	3	29.302	35	35	—	Cloudy	29.200	38	38	—	Cloudy & Do.	—.084	32	32	—	Snow
M.	4	28.978	25	25	—	Sharp Frost	—.057	33	33	—	Snowing	—.185	31	31	—	Clear
T.	5	29.316	31	31	—	Densely Overcast	—.318	34	34	—	Ditto	—.376	29	29	—	Ditto
W.	6	—.518	28	28	—	Hazy	—.558	29	25	4	Frosty haze	—.631	26	26	—	Overcast
○ Th	7	—.698	15	15	—	Severe Frost	—.698	23	20	3	Sharp frost	—.760	15	15	—	Clear
F.	8	—.889	15	15	—	Very dense Fog	—.893	17	17	—	Frosty & foggy	—.866	14	14	—	Severe frost
S.	9	—.738	11	11	—	Intense Frost	—.665	32	32	—	Cloudy	—.441	27	23	4	Hazy
S.	10	—.247	33	33	—	Overcast	—.214	35	35	—	Slight haze	—.089	33	33	—	Slight Rain
M.	11	28.864	35	35	—	Ditto	28.950	38	38	—	Clear	—.064	32	32	—	Overcast
T.	12	29 364	35	35	—	Cloudy	29.469	39	34	5	Ditto	—.578	32	32	—	Clear
W.	13	—.563	29	29	—	Foggy	— 399	38	38	—	Rain	—.324	33	33	—	Overcast
☾ Th.	14	—.386	36	36	—	Cold easterly haze	—.296	38	38	—	Clear	—.165	33	33	—	Snowing
F.	15	—.559	35	35	—	Clearing	—.653	42	42	—	Rain	—.687	34	34	—	Overcast
S.	16	—.631	36	36	—	Hazy	—.533	50	50	—	Ditto	—.365	51	51	—	Rain
S.	17	—.605	48	48	—	Slightly Overcast	—.608	51	51	—	Overcast	—.729	47	47	—	Clear
M.	18	—.707	46	46	—	Rain	—.685	48	48	—	Ditto	—.725	40	40	—	Rain
T.	19	—.778	35	35	—	Overcast	—.826	37	37	—	Slight rain	—.918	32	28	4	Overcast
W.	20	30.019	32	32	—	Cloudy & Cold	30.077	34	27	7	Clear	30.182	32	32	—	Ditto
Th.	21	—.505	29	28	1	Frosty	—.374	38	36	2	Fine, with Sun	—.421	32	32	—	Fine
● F.	22	—.303	31	31	—	Ditto	—.277	40	36	4	Cloudy	—.157	41	41	—	Overcast
S.	23	—.055	34	34	—	Clear	—.108	42	42	—	Clear	—.001	36	36	—	Cloudy & fine
S.	24	29.796	37	37	—	Boisterous	29.848	36	27	9	Ditto, cold & dry	—.161	31	30	1	Clear
M.	25	30.336	27	24	3	Clear & frosty	30.301	37	32	5	Clear	—.195	35	35	—	Overcast
T.	26	29.991	42	42	—	Hazy	29.988	48	45	3	Overcast & fine	—.000	46	46	—	Ditto
W.	27	30.015	47	47	—	Slightly Overcast	30.083	52	50	2	Very Fine	—.225	34	34	—	Clear
Th.	28	30.287	33	33	—	Cloudy	—.300	44	44	—	Cloudy	—.250	35	35	—	Very Clear
F.	29	—.176	34	34	—	Fine	—.185	44	38	6	Fine but cool	—.208	38	38	—	Overcast
☽ S.	30	—.251	38	38	—	Hazy	—.235	40	40	—	Hazy	—.212	39	39	—	Hazy
S.	31	—.182	39	39	—	Foggy	—.165	42	42	—	Rain	—.190	30	30	—	Overcast
		29.773	33.13	33.00	0.13		29.773	38.58	37.16	1.42		29.770	33.87	33.58	0.29	

JANUARY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	45	34	48	28	W	Little	
2	45	32	45	31	——	Ditto	.15
3	39	21	39	16	NW	Brisk	
4	35	29	37	25	——	Little	
5	33	22	33	18	N	Brisk	
6	30	12	31	6	SE	Little	
7	27	6	27	—1	NE	Ditto	
8	20	6	22	0	NW	Ditto	
9	33	27	34	23	S	Brisk	
10	39	31	40	18	SE	Little	.40
11	39	33	40	26	SW	Ditto	.02
12	39	22	40	17	——	Ditto	
13	38	32	48	31	E	Ditto	.29
14	36	32	40	31	NE	Ditto	.80
15	39	31	40	25	SE	Ditto	.15
16	52	40	52	40	SW	Brisk	.16
17	52	45	52	44	——	Ditto	.02
18	47	33	47	29	W	Little	.24
19	36	28	37	23	N	Ditto	.02
20	34	22	37	16	——	Brisk	
21	38	25	41	20	NW	Ditto	
22	44	32	45	30	SW	Little	.10
23	43	32	46	29	NW	Ditto	
24	38	26	40	22	N	Brisk	.02
25	40	32	44	30	W	Little	.01
26	49	43	51	41	SW	Ditto	
27	53	34	56	24	W	Ditto	
28	44	28	44	23	——	Ditto	
29	46	32	48	29	N	Ditto	.02
30	40	37	40	35	W	Ditto	.08
31	42	28	42	26	E	Ditto	.12
	39.90	28.61	41.11	24.35			2.60

Remarks.

The mean temperature was about 2° below the average for this month. On the nights of the 7th and 8th the frost was intense, the thermometer falling to within 6° of zero. The barometer was consid.rably below the average; and the depth of rain was more than an inch above the usual quantity. A tremendous thunder storm occurred on the 3rd, about 7 A. M., accompanied at first with high wind, then hail and sleet; the flashes of lightning being unusually large and vivid. Much rain and snow fell between the 10th and 15th; a rapid thaw took place on the 16th, the water at the same time being prevented from sinking into the earth by the frozen crust, which was from 8 to 12 inches in depth, where the ground was bare; the consequences were great inundations throughout the country, with loss of life and property.

Mean Pressure from the 3 daily observations	29.772 inches
—— Temperature .... Ditto	35°.19
—— Dew Point .... Ditto	34.58
—— Degree of Dryness ... Ditto	0.61
—— Degree of Moisture .. Ditto	.976
—— Force of Vapour .... Ditto	.200 inch.
Least observed degree of Moisture	.708
Maximum Temperature in the Shade	53°.
Minimum Temperature in ditto	6°.
Maximum Temperature in the Sun	56°.
Minimum of Terrestrial Radiation	–1°.
Mean Temperature of external Air	34°.25

WINDS.

North...... 5 days	N. East...... 2 days
South...... 1 ..	S. East...... 3 ..
East........ 2 ..	N. West..... 5 ..
West....... 7 ..	S. West...... 6 ..

31 days.

Amount of Rain................. 2.60 inches.

FEBRUARY.

1841.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
M.	1	30.346	30	25	5	Overcast	30.298	31	31	—	Snowing	30.268	25	25	—	Snowing
T.	2	—.093	26	26	—	Snowing	—.010	32	20	12	Snow-showers	29.931	22	22	—	Ditto
W.	3	—.003	20	15	5	Sharp Frost	—.020	29	13	16	Overcast and dry	—.977	17	17	—	Severe frost
Th.	4	29.803	25	25	—	Overcast	29.722	27	18	9	Ditto Ditto	—.670	28	28	—	Overcast
F.	5	—.688	24	20	4	Clear and Dry	—.699	29	24	5	Dry cold haze	—.722	26	20	6	Windy
○ S.	6	—.661	27	25	2	Overcast, boister-	—.639	29	27	2	Ditto	—.609	26	24	2	Overcast & do
S.	7	—.500	24	20	4	Boisterous [ous	—.465	26	21	5	Ditto	—.443	26	22	4	Ditto
M.	8	—.395	26	26	—	Overcast	—.402	29	29	—	Hazy	—.442	26	26	—	Ditto
T.	9	—.645	27	23	4	Ditto	—.796	30	30	—	Ditto	—.952	29	29	—	Ditto
W.	10	30.017	29	29	—	Hazy	30.002	30	29	1	Ditto	—.959	29	29	—	Ditto
Th.	11	29.866	36	36	—	Ditto	29.692	39	39	—	Ditto	—.657	39	39	—	Drizzly
F.	12	—.640	40	40	—	Dense fog	—.680	49	49	—	Very Fine	—.745	42	42	—	Rain
☾ S.	13	—.659	45	45	—	Overcast	—.564	46	46	—	Rain	—.313	45	45	—	Slight Rain
S.	14	—.157	48	48	—	Rain	—.175	51	51	—	Cloudy	—.288	45	45	—	Overcast
M.	15	—.263	43	43	—	Overcast	—.168	50	47	3	Ditto	—.071	45	45	—	Slight Rain
T.	16	—.086	46	46	—	Hazy	—.048	52	48	4	Slightly Overcast	—.141	45	45	—	Overcast
W.	17	—.230	40	40	—	Rain	—.359	44	44	—	Hazy	—.584	43	43	—	Ditto
Th.	18	—.614	41	41	—	Fine	—.561	52	50	2	Fine	—.490	46	46	—	Clear
F.	19	—.601	45	45	—	Drizzly	—.676	49	49	—	Rain	—.744	44	44	—	Cloudy & fine
S.	20	—.808	41	41	—	Cloudy	—.808	54	54	—	Cloudy, Fine	—.977	45	45	—	Rain
● S.	21	30.162	44	44	—	Overcast and fine	30.188	52	46	6	Ditto	30.296	36	36	—	Foggy
M.	22	—.345	39	39	—	Dense fog	—.341	42	42	—	Foggy	—.323	41	41	—	Overcast
T.	23	—.323	40	40	—	Hazy	—.309	43	39	4	Fine	—.298	36	36	—	Ditto
W.	24	—.300	36	35	1	Ditto	—.298	40	38	2	Hazy & cold	—.304	41	41	—	Slight Rain
Th.	25	—.308	40	40	—	Cloudy and cold	—.255	42	40	2	Cloudy	—.076	40	40	—	Rain
F.	26	29.872	41	41	—	Rain	29.816	48	48	—	Ditto	29.638	41	41	—	Cloudy
S.	27	—.730	38	38	—	Cloudy and cold	—.801	42	42	—	Cloudy	—.368	35	35	—	Showery
☽ S.	28	—.874	37	37	—	Very clear	—.836	44	28	16	Ditto & Fine	—.681	35	35	—	Cloudy & fine
		29.785	35.64	34.75	0.89		29.772	40.39	37.21	3.18		29.748	35.64	35.21	0.43	

FEBRUARY.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	31	23	42	19	NE	Brisk	
2	31	18	33	16	——	Ditto	
3	28	14	29	8	E	Ditto	
4	30	22	30	18	NE	Ditto	
5	30	26	30	21	——	Strong	
6	28	24	28	22	E	Ditto	
7	27	24	27	20	——	Ditto	
8	29	26	29	24	NE	Little	
9	30	27	30	26	——	Ditto	
10	32	27	32	26	SE	Ditto	.04
11	41	37	41	35	S	Ditto	.04
12	51	38	60	38	SW	Ditto	.04
13	51	44	51	43	S	Brisk	.01
14	52	41	54	39	SW	Ditto	
15	49	42	49	40	S	Ditto	.15
16	51	39	52	37	SE	Little	.11
17	46	36	46	31	W	Ditto	.01
18	53	38	55	34	S	Brisk	.04
19	50	35	55	32	SW	Little	.02
20	56	40	62	39	S	Brisk	.11
21	56	29	61	28	NE	Little	
22	42	38	43	37	——	Ditto	
23	44	32	50	32	——	Ditto	
24	40	36	50	32	——	Ditto	.01
25	42	35	44	30	——	Brisk	.07
26	48	35	50	33	NW	Little	.04
27	45	32	50	27	N	Brisk	.07
28	47	32	53	30	NW	Little	
	41.42	31.78	44.14	29.17			0.76

Remarks.

The mean temperature was nearly 3° below the average. The barometer also averaged low, although only half the usual quantity of rain fell. The frost was not at any time remarkably intense; but up to the 10th it was continued, the thermometer being night and day below freezing. The frost had reached as much as 9 inches below the surface in kitchen garden soil; and this crust was completely thawed by the 15th. Although the frost had neither penetrated so far below the surface, nor was so intense above ground, as in the preceding month; yet, being accompanied by a brisk, and, for the period of the season, very drying East and North East winds, vegetation suffered much more.

Mean Pressure from the 3 daily observations 29.768 inches.
—— Temperature .... Ditto ...... 37°.22
—— Dew Point .... Ditto ...... 35°.72
—— Degree of Dryness .... Ditto ...... 1°.50
—— Degree of Moisture .. Ditto ...... .942
—— Force of Vapour .... Ditto ...... .213 inch.
Least observed degree of Moisture ...... .533
Maximum Temperature in the Shade .... 56°.
Minimum Temperature in ditto .... 14°.
Maximum Temperature in the Sun ...... 62°.
Minimum of Terrestrial Radiation ...... 8°.
Mean Temperature of External Air ...... 36°.60

WINDS.

North ...... 1 days	N. East..... 11 days
South .... 5 ..	S. East....... 2 ..
East......... 3 ..	N. West...... 2 ..
West .... 1 ..	S. West...... 3 ..

28 days.

Amount of Rain................0.76 inches.

MARCH.

		Morning.					Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
M.	1	29.587	38	38	—	Overcast	29.616	42	42	--	Cloudy	29.693	35	35	—	Cloudy
T.	2	—.685	33	33	—	Do. & Frosty	—.609	44	44	—	Slight rain	—.393	43	43	—	Rain
W.	3	—.315	41	41	—	Fine	—.393	47	40	7	Cloudy	—.665	41	41	—	Cloudy
Th.	4	—.904	34	34	—	Clear	—.890	43	33	10	Fine	—.818	39	39	—	Rain
F.	5	—.857	36	36	—	Ditto & Damp	—.710	47	47	—	Thickly Overcast	—.299	48	48	—	Slight rain
S.	6	—.723	41	41	—	Very Clear	—.852	50	43	7	Very Fine	—.960	44	44	—	Fine
○ S.	7	30.047	51	51	—	Very Fine	30.096	60	53	7	Ditto	30.255	45	45	—	Ditto
M.	8	—.362	50	50	—	Overcast	—.369	62	55	7	Overcast & fine	—.355	45	45	—	Clear & Ditto
T.	9	—.392	42	42	—	Foggy	—.392	58	53	5	Very Fine	—.385	39	39	—	Ditto
W.	10	—.426	38	38	—	Ditto	—.426	59	50	9	Ditto	—.462	37	37	—	Ditto
Th.	11	—.473	37	37	—	Dense Fog	—.424	58	52	6	Ditto	—.401	39	39	—	Clear
F.	12	—.366	34	34	—	Foggy	—.323	60	48	12	Ditto	—.273	41	41	—	Ditto
S.	13	—.331	38	38	—	Slight Fog	—.337	55	50	5	Slight Haze	—.376	39	39	—	Foggy
S.	14	—.351	40	40	—	Foggy	—.265	50	40	10	Very Fine	—.192	39	39	—	Dense Fog
☾ M.	15	—.152	38	38	—	Ditto	—.101	60	55	5	Ditto	—.005	39	39	—	Clear
T.	16	29.921	37	37	—	Ditto	29.832	63	41	22	Cloudless, fine	29.729	44	44	—	Ditto
W.	17	—.603	50	50	—	Slight rain	—.577	55	55	—	Cloudy & showery	—.583	43	43	—	Ditto
Th.	18	—.404	50	50	—	Cloudy	—.450	57	48	9	Cloudy	—.525	43	43	—	Ditto
F.	19	—.598	48	44	4	Overcast	—.600	54	54	—	Showery	—.713	43	43	—	Clear
S.	20	—.647	47	47	—	Fine	—.608	47	47	—	Stormy with rain	—.565	43	43	—	Slight Rain
S.	21	—.625	47	47	—	Very Fine	—.636	55	47	8	Cloudy & Fine	—.482	49	49	—	Ditto
M.	22	— 362	52	52	—	Rain	—.391	56	50	6	Ditto	—.596	41	41	—	Clear
● T.	23	—.803	47	47	—	Fine	—.946	58	45	13	Fine	30.128	44	44	—	Ditto
W.	24	30.206	50	47	3	Overcast	30.222	56	50	6	Cloudy	—.192	40	40	—	Ditto
Th.	25	—.123	46	46	—	Very Fine	—.045	61	52	9	Very Fine	29.952	41	41	—	Ditto
F.	26	29.698	54	54	—	Ditto	29.608	66	55	11	Ditto	—.593	46	46	—	Cloudy & Fine
S	27	—.721	49	49	—	Overcast	—.758	56	56	—	Showery	—.863	40	40	—	Clear
S.	28	—.914	39	39	—	Fine	—.904	53	42	11	Cloudy	—.897	48	43	5	Ditto
M.	29	—.922	50	50	—	Overcast	—.858	55	52	3	Ditto	—.787	45	45	—	Rain
☽ T.	30	—.853	45	45	—	Fine	—.915	55	40	15	Ditto & Fine	—.836	48	48	—	Cloudy & Fine
W.	31	—.638	46	46	—	Clear	—.598	55	40	15	Fine but windy	—.497	45	45	—	Rain
		29.903	43.48	43.26	0.22		29.895	54.74	47.71	7.03		29.886	42.45	42.29	0.16	

MARCH.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	41	27	42	22	S	Little	.10
2	49	37	53	34	SW	Ditto	.30
3	50	29	53	22	——	Ditto	.02
4	46	33	52	29	W	Little	.08
5	50	36	50	32	S	Brisk	.22
6	52	41	60	38	NW	Little	
7	61	42	64	39	SW	Ditto	
8	61	35	66	29	——	Ditto	
9	60	30	66	25	——	Ditto	
10	63	27	69	22	S	Ditto	
11	64	30	70	24	SE	Ditto	
12	67	31	74	25	SW	Ditto	
13	59	37	61	35	E	Ditto	
14	57	33	59	28	W	Ditto	
15	66	30	74	25	——	Ditto	
16	65	35	71	30	S	Ditto	
17	56	41	62	36	——	Ditto	.01
18	56	40	61	35	SW	Strong	
19	54	34	59	29	——	Ditto	.01
20	57	39	60	35	——	Ditto	.13
21	54	48	59	47	S	Brisk	.12
22	58	36	62	36	SW	Strong	.02
23	59	43	64	40	W	Brisk	
24	58	30	64	24	SW	Ditto	
25	61	32	65	27	S	Little	
26	65	39	70	34	——	Ditto	.02
27	58	27	65	23	SW	Ditto	.08
28	54	40	60	35	S	Ditto	
29	58	40	64	36	SW	Ditto	.10
30	55	41	60	39	W	Ditto	.08
31	56	41	61	40	——	Strong	.03
	57.09	35.61	61.93	31.45			1.32

Remarks.

This month was on the whole exceedingly fine for the period of the season. Vegetation was in a very dormant state at the commencement; for the three preceding months were of a severe character; but in the present the mean temperature was nearly 4° above the average, and by the end of the third week Peach and Nectarine trees on walls were in blossom, and the common Hawthorn partially in leaf. It was the warmest March since 1830. The thermometer was seldom below freezing and only once so low as 27°. The amount of rain was exactly the average quantity; still however the barometer was lower than usual. The wind was chiefly from the South and South West, and not so boisterous as is generally the case in this month.

Mean Pressure from the 3 daily observations 29.895 inches.
—— Temperature .... Ditto ...... 46°.89
—— Dew Point .... Ditto ...... 44°.42
—— Degree of Dryness ... Ditto ...... 2°.47
—— Degree of Moisture .. Ditto ...... .916
—— Force of Vapour ..... Ditto ...... .295 inch.
Least observed degree of Moisture ...... .546
Maximum Temperature in the Shade .... 67°.
Minimum Temperature in ditto .... 27°.
Maximum Temperature in the Sun ...... 74°.
Minimum of Terrestrial Radiation ...... 22°.
Mean Temperature of External Air .... 46°.35

Winds.

North ......0 day	N. East...... 0 days
South ...... 9 ..	S. East...... 1 ..
East .... 1 ..	N. West..... 1 ..
West....... 6 ..	S. West .....13 ..

31 days.

Amount of Rain.................. 1.32 inch.

APRIL.

		Morning.					Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
Th.	1	29.603	45	45	—	Cloudy	29.632	52	45	7	Cloudy	29.596	46	46	—	Overcast
F.	2	—.606	45	45	—	Fine	—.648	52	40	12	Fine	—.727	36	36	—	Clear
S.	3	—.707	42	38	4	Slight Haze	—.640	54	38	16	Cloudy & Do.	—.661	35	35	—	Ditto
S.	4	—.642	42	42	—	Clear	—.566	52	44	8	Ditto	—.467	45	45	—	Slight Rain
M.	5	—.371	45	45	—	Cloudy	—.401	54	45	9	Ditto	—.436	40	40	—	Fine
○ T.	6	—.661	46	43	3	Light Clouds	—.692	55	43	12	Very Fine	—.745	36	36	—	Clear
W.	7	—.781	42	40	2	Overcast	—.779	53	44	9	Fine	—.777	44	44	—	Overcast
Th.	8	—.779	45	45	—	Fine	—.779	45	45	—	Hail Showers	—.775	41	41	—	Cloudy & fine
F.	9	—.820	40	40	—	Ditto but cold	—.900	50	46	4	Overcast&cold	—.988	39	39	—	Ditto
S.	10	—.986	46	39	7	Overcast & Fine	30.020	49	40	9	Cloudy	—.958	43	43	—	Overcast
S.	11	—.939	42	40	2	Ditto & Cold	29.936	50	34	16	Ditto & Cold	—.923	34	34	—	Clear
M.	12	—.907	41	40	1	Ditto	—.911	45	34	11	Cloudy	—.962	34	34	—	Ditto
☾ T.	13	30.077	44	40	4	Slightly Overcast	30.078	55	35	20	Ditto	30.130	44	44	—	Rain
W.	14	—.088	50	50	—	Overcast	—.048	54	50	4	Cloudy	29.983	47	47	—	Slight rain
Th.	15	29.899	46	41	5	Clear	29.802	51	51	—	Showery	—.761	46	46	—	Clear
F.	16	—.717	40	40	—	Ditto	—.714	52	30	22	Fine	—.762	44	44	—	Overcast
S.	17	—.874	46	45	1	Ditto	—.911	57	34	23	Very Fine	—.946	43	43	—	Clear
S.	18	—.975	49	45	4	Overcast & cold	—.928	62	40	22	Ditto	—.924	47	44	3	Overcast
M.	19	—.881	47	47	—	Fine	—.895	54	32	22	Fine	—.894	39	39	—	Clear
T.	20	—.803	48	42	6	Overcast & Do.	—.697	53	32	21	Overcast	—.682	42	40	2	Ditto
● W.	21	—.810	46	40	6	Cold & Dry	—.861	53	39	14	Cloudy& cold	—.904	40	40	—	Cloudy & fine
Th.	22	—.866	46	40	6	Cloudy & Do.	—.830	54	37	17	Ditto	—.734	45	45	—	Overcast
F.	23	—.450	43	43	—	Heavy Rain	—.500	48	48	—	Rain	—.645	41	41	—	Clear
S.	24	—.677	49	49	—	Fine	—.611	58	48	10	Fine	—.528	48	48	—	Rain
S.	25	—.650	53	50	3	Very Fine	—.760	57	57	—	Slight rain	—.846	54	54	—	Cloudy&windy
M.	26	—.980	58	58	—	Hazy	30.037	60	60	—	Fine	30.100	57	57	—	Overcast
T.	27	30.078	64	60	4	Very Fine	—.082	74	55	19	Very Fine	—.103	56	56	—	Fine
☽ W.	28	—.132	60	60	—	Rain	—.129	69	69	—	Rain	—.099	58	58	—	Clear
Th.	29	—.098	52	52	—	Ditto	—.106	69	61	8	Very Fine	—.141	52	52	—	Ditto
F.	30	—.171	55	43	12	Dry Haze	—.132	67	45	22	Dry Haze	—.091	50	50	—	Ditto
		29.834	47.23	44.90	2.33		29.834	55.26	44.03	11.23		29.842	44.20	44.03	0.17	

APRIL.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	52	41	61	36	W	Little	.05
2	56	26	61	20	NW	Brisk	
3	57	26	63	21	——	Little	
4	55	39	60	41	SW	Brisk	.11
5	56	35	62	30	S	Little	
6	55	31	63	26	NE	Ditto	.02
7	52	37	62	34	SW	Ditto	.03
8	53	34	60	30	W	Brisk	
9	55	37	62	31	N	Ditto	.01
10	49	31	51	25	E	Little	
11	49	32	57	27	NE	Brisk	.01
12	45	27	52	21	——	Ditto	
13	56	42	61	41	SW	Little	.08
14	57	32	62	28	——	Ditto	.01
15	58	26	64	21	NW	Ditto	.05
16	57	31	64	24	——	Ditto	
17	60	39	66	34	NE	Ditto	
18	61	41	66	38	W	Brisk	.14
19	58	32	63	25	——	Ditto	
20	56	36	63	34	——	Ditto	
21	53	40	59	36	NE	Ditto	
22	53	41	60	40	——	Ditto	.32
23	48	28	55	25	NW	Little	.52
24	56	39	61	36	SW	Brisk	.15
25	59	52	64	51	S	Strong	
26	66	55	69	51	SW	Ditto	
27	75	46	80	43	——	Little	
28	76	45	79	44	NE	Ditto	.07
29	71	42	80	36	——	Ditto	.01
30	68	41	81	35	——	Ditto	
	57.40	36.79	63.70	32.76			1.58

Remarks.

The mean pressure, temperature, and amount of rain were a fraction below the averages. Vegetation was brought much forward by the fine weather in March; but it progressed very slowly during the first three weeks of the present month, the temperature being low, generally, and often below freezing at night. In the last week, however, a fresh impulse was given to vegetation, in consequence of a rise of mean temperature to more than 5° above the average, with a plentiful supply of moisture. The 24th and 25th were boisterous; the 27th very sultry, with lightning at night.

Mean Pressure from the 3 daily observations 29.839 inches.
—— Temperature .... Ditto ...... 48°.90
—— Dew Point .... Ditto ...... 44°.32
—— Degree of Dryness ... Ditto ...... 4°.58
—— Degree of Moisture .. Ditto ...... .847
—— Force of Vapour. .... Ditto ...... .294 inch.
Least observed degree of Moisture .... .432
Maximum Temperature in the Shade ...... 76°.
Minimum Temperature in ditto .... 26°.
Maximum Temperature in the Sun ...... 81°.
Minimum of Terrestrial Radiation ...... 20°.
Mean Temperature of External Air ...... 47°.09

WINDS.

North.....	1 days	N. East......	9 days
South......	2 ..	S. East.......	0 ..
East.......	1 ..	N. West.....	5 ..
West.......	5 ..	S. West......	7 ..

30 days.

Amount of Rain........................ 1.58 inch.

MAY.

		Morning.					Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.998	54	50	4	Fine	29.929	71	49	22	Very Hot	29.794	49	49	—	Clear
S.	2	—.674	65	60	5	Very Fine	—.673	66	54	12	Cloudy	—.640	52	52	—	Overcast
M.	3	—.716	49	49	—	Rain	—.780	49	49	—	Rain	—.752	45	45	—	Rain
T.	4	—.609	54	54	—	Foggy	—.550	68	62	6	Fine	—.480	54	54	—	Cloudy & fine
○ W.	5	—.399	56	56	—	Rain	—.488	63	63	—	Showery	—.571	53	53	—	Do. Lightning
Th.	6	—.495	58	58	—	Ditto	—.575	65	56	9	Cloudy	—.774	46	46	—	Clear & fine
F.	7	—.708	58	53	5	Fine	—.670	66	56	10	Ditto	—.528	50	50	—	Rain
S.	8	—.492	59	59	—	Cloudy & Do.	—.491	60	60	—	Heavy showers	—.581	48	48	—	Clear
S.	9	30.008	54	52	2	Very Fine	30.076	62	44	18	Very Fine	30.097	53	53	—	Cloudy & fine
M.	10	—.117	68	55	1	Cloudy	—.149	65	55	10	Cloudy & Do.	—.158	54	50	4	Ditto
T.	11	—.054	63	60	3	Overcast & fine	—.003	73	60	13	Very Fine	—.020	54	54	—	Rain
W.	12	—.128	57	53	4	Fine	—.177	65	55	10	Cloudy & Do.	—.247	55	55	—	Overcast
☾ Th.	13	—.321	55	50	5	Clear & Ditto	—.314	65	40	25	Fine	—.330	50	50	—	Clear
F.	14	—.364	51	43	8	Dry Haze	—.320	64	46	18	Very Fine	—.262	46	46	—	Ditto
S.	15	—.194	60	55	5	Fine	—.131	71	50	21	Ditto	—.043	49	49	—	Ditto
S.	16	29.911	56	50	6	Very Fine	29.860	69	56	13	Ditto	29.674	54	54	—	Fine
M.	17	—.632	56	50	6	Cloudy, windy	—.551	63	52	11	Overcast	—.518	53	53	—	Slight Rain
T.	18	—.553	59	52	7	Ditto	—.547	66	50	16	Fine	—.531	50	50	—	Cloudy & fine
W.	19	—.381	52	52	—	Rain	—.280	56	56	—	Cloudy	—.674	50	50	—	Rain
● Th.	20	—.253	59	50	9	Boisterous	—.370	54	54	—	Showery	—.578	47	47	—	Clear
F.	21	—.647	60	55	5	Fine	—.578	69	49	20	Dry haze	—.526	51	51	—	Rain
S.	22	—.607	63	63	—	Showery & mild	—.680	64	60	4	Overcast	—.811	53	53	—	Cloudy & fine
S.	23	—.994	63	60	3	Slight haze	30.025	72	50	22	Cloudy, Fine	30.159	52	52	—	Clear
M.	24	30.180	62	56	6	Ditto	—.137	71	64	7	Fine	—.149	62	62	—	Cloudy & fine
T.	25	—.147	64	60	4	Dry east wind	—.133	73	67	6	Ditto	—.165	60	60	—	Overcast
W.	26	—.070	68	62	6	Hot dry haze	—.042	77	65	12	Hot & Dry	29.955	64	64	—	Clear
☽ Th.	27	29.882	70	65	5	Fine	29.828	80	70	10	Ditto	—.823	67	67	—	Much lightning
F.	28	—.893	70	65	5	Sultry	—.947	78	60	18	Very Fine	30.038	58	58	—	Clear [ing
S.	29	30.096	63	53	10	Very Fine	30.081	72	50	22	Do. & overcast	—.061	60	60	—	Overcast, lightn-
S.	30	—.016	63	63	—	Overcast	—.016	72	60	12	Ditto	29.979	57	57	—	Very Fine
M.	31	—.003	63	50	13	Very Fine	29.995	74	55	19	Ditto	30.042	55	55	—	Do. & Clear
		29.856	59.74	55.26	4.48		29.851	67.19	55.39	11.80		29.869	53.26	53.13	0.13	

MAY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	76	42	96	38	E	Little	
2	76	45	83	45	SW	Strong	.25
3	50	43	61	43	NE	Little	.30
4	69	50	82	49	S	Ditto	.70
5	62	46	82	44	SW	Strong	.15
6	65	43	73	39	——	Ditto	.02
7	66	47	72	45	S	Brisk	.10
8	62	44	65	41	SW	Ditto	.16
9	65	50	76	49	——	Ditto	
10	65	46	67	42	——	Ditto	
11	77	46	80	44	S	Little	.01
12	62	39	62	33	NE	Ditto	
13	66	36	80	32	——	Ditto	
14	65	40	79	33	——	Ditto	
15	74	40	91	35	W	Ditto	
16	74	49	87	44	SW	Ditto	
17	68	45	75	43	——	Brisk	.01
18	66	46	70	44	——	Ditto	.02
19	60	47	65	45	S	Strong	.15
20	61	39	70	33	SW	Ditto	.06
21	69	54	70	52	E	Little	.16
22	68	43	78	39	S	Ditto	.01
23	75	46	88	42	SE	Brisk	
24	70	51	80	46	E	Little	
25	73	54	88	54	NE	Brisk	
26	80	58	90	56	——	Ditto	
27	82	60	92	59	——	Ditto	.03
28	80	51	96	47	SW	Little	
29	72	54	80	54	N	Ditto	.03
30	74	49	80	46	NW	Ditto	
31	78	49	95	44	W	Ditto	
	69.35	46.83	79.13	43.87			2.16

Remarks.

This month was genial for vegetation throughout. The amount of rain was greater than usual by rather more than half an inch; but the temperature was also higher by 2°.7. Nor was the growth of vegetation hence induced unsubstantial like that produced by heat and a continually moist and sunless atmosphere; for notwithstanding the more than usual quantity of rain, there were but few days on which a great amount of dryness was not detected by the hygrometer. The 27th was hot and sultry; at ¼ past 8 P. M. sheet lightning, with some of the zig-zag kind, appeared almost continuous; thunder was heard between 10 and 11, and abrupt showers of rain fell in heavy drops.

Mean Pressure from the 3 daily observataions 29.858 inches
—— Temperature ....Ditto....... 60°.06
—— Dew Point ....Ditto....... 54°.59
—— Degree of Dryness ....Ditto....... 5°.47
—— Degree of Moisture ...Ditto....... .821
—— Force of Vapour .....Ditto....... .423 inch.
Least observed degree of Moisture .... .410
Maximum Temperature in the Shade ...... 82°.
Minimum Temperature in ditto.......... 36°.
Maximum Temperature in the Sun ...... 96°.
Minimum of Terrestrial Radiation .... 32°.
Mean Temperature of External Air .... 58°.09

WINDS.

North...... 1 days	N. East.... 7 days
South...... 5 ..	S. East..... 1 ..
East........ 3 ..	N. West.... 1 ..
West....... 2 ..	S. West... 11 ..

31 days.

Amount of Rain ....2.16 inches.

JUNE.

1841.	Days.	Morning.					Noon.					Night.				
		Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
T.	1	30.122	65	60	5	Very Fine	30.137	71	56	15	Overcast & fine	30.137	56	56	—	Clear
W.	2	—.177	63	58	5	Ditto	—.167	70	59	11	Very Fine	—.177	62	62	—	Cloudy & Fine
Th.	3	—.173	63	50	13	Ditto & dry	—.157	70	42	28	Ditto & Dry	—.254	53	53	—	Clear
○ F.	4	—.357	59	47	12	Ditto cast	—.329	67	45	22	Ditto	—.300	55	55	—	Fine
S.	5	—.210	62	50	12	Slightly Over-	—.128	70	50	20	Ditto	—.004	51	51	—	Rain
S.	6	29.981	56	46	10	Fine	29.967	61	46	15	Ditto	29.923	49	49	—	Slight Rain
M.	7	—.921	52	44	8	Cold & dry	—.936	55	55	—	Showery & cold	—.956	48	48	—	Ditto
T.	8	—.965	52	48	4	Cloudy & cold	—.958	58	47	11	Cloudy	—.974	49	49	—	Cloudy
W.	9	—.947	50	48	2	Ditto	—.942	58	50	8	Ditto	—.911	43	43	—	Clear
Th.	10	—.815	54	50	4	Overcast	—.762	65	54	11	Very Fine	—.669	52	52	—	Ditto & Fine
F.	11	—.687	52	50	2	Do. & Cold	—.712	56	50	6	Cloudy & cold	—.775	50	45	5	Cloudy & Do.
☾ S.	12	—.807	50	50	—	Slight Rain	—.903	55	50	5	Overcast	—.973	44	44	—	Clear
S.	13	30.034	50	48	2	Overcast & cold	30.040	59	48	11	Cloudy & cold	—.944	43	43	—	Ditto
M.	14	—.047	57	50	7	Fine but cold	29.959	70	50	20	Very Fine	—.906	54	54	—	Overcast
T.	15	29 895	56	56	—	Slight drizzle	—.946	64	52	12	Cloudy & Do.	30.097	51	51	—	Cloudy & Fine
W.	16	30.208	58	44	14	Fine, dry air	30.186	69	50	19	Very Fine	—.111	47	47	—	Clear
Th.	17	—.079	63	50	13	Cloudy, Do.	—.044	68	50	18	Cloudy & Do.	29.875	48	48	—	Ditto [ning
F.	18	29 788	62	55	7	Very Fine	29 716	80	58	22	Sultry	—.605	60	60	—	Rain, light-
● S.	19	—.607	60	60	—	Cloudy	—.613	66	58	8	Ditto	—.689	52	52	—	Clear
S.	20	—.759	62	58	4	Very Fine	—.740	66	66	—	Slight Rain	—.724	52	52	—	Rain
M.	21	—.769	65	61	4	Fine	—.854	66	66	—	Heavyshowers	—.959	52	52	—	Showery
T.	22	30 059	60	60	—	Very Fine	30.030	69	55	14	Cloudy	—.994	54	54	—	Fine
W.	23	—.028	61	55	6	Do. Overcast	29.913	64	64	—	Heavy rain	—.812	54	54	—	Cloudy
Th.	24	29 741	63	60	3	Slightly overcast	—.699	63	63	—	Ditto	—.639	58	58	—	Overcast
☽ F.	25	—.514	59	59	—	Heavy Rain	—.494	70	65	5	Fine	—.543	58	58	—	Ditto
S.	26	—.605	68	68	—	Cloudy	—.683	69	65	4	Cloudy & Do.	—.774	54	54	—	Clear
S.	27	—.951	56	56	—	Showery	—.979	68	68	—	Showery	30.128	52	52	—	Fine
M.	28	—.981	56	56	—	Rain	—.924	60	60	—	Ditto	29.773	56	56	—	Rain
T.	29	—.761	61	61	—	Cloudy	—.743	66	62	4	Ditto	—.817	54	54	—	Cloudy
W.	30	—.966	62	60	2	Fine	—.927	64	60	4	Fine	30.093	53	53	—	Fine
		29.931	58.56	53.93	4.63		29.919	65.23	55.47	9.76		29.917	52.13	51.97	0.17	

JUNE.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	72	47	91	42	NE	Little	
2	75	53	89	48	W	Ditto	
3	73	41	90	35	—	Ditto	
4	72	46	95	41	NW	Ditto	
5	73	46	90	46	W	Brisk	.03
6	59	40	60	35	NE	Little	.01
7	57	46	68	45	N	Brisk	.02
8	56	46	60	44	—	Ditto	
9	57	39	68	32	NE	Ditto	
10	71	41	80	34	N	Little	
11	54	45	64	43	—	Brisk	
12	53	37	56	29	NE	Little	.01
13	65	37	68	33	NW	Ditto	
14	72	53	77	50	—	Ditto	
15	69	36	77	28	—	Brisk	.01
16	72	41	77	35	S	Little	
17	70	41	77	35	—	Ditto	
18	80	54	85	53	—	Ditto	.24
19	69	45	74	43	W	Ditto	.08
20	66	54	70	52	SW	Brisk	.02
21	71	47	76	43	—	Ditto	.26
22	73	46	77	41	W	Little	.01
23	73	44	79	40	S	Ditto	.40
24	72	54	80	52	W	Ditto	.49
25	70	54	74	50	SW	Brisk	.04
26	67	52	71	50	—	Ditto	
27	70	52	72	48	W	Little	.10
28	62	50	73	48	S	Ditto	.65
29	69	48	73	45	SW	Ditto	.07
30	67	52	72	51	NW	Ditto	.01
	67.30	45.16	75.43	42.37			2.45

Remarks.

In this month the supply of moisture was abundant; but heat was deficient. The mean temperature, instead of progressing, fell 2° lower than that of the preceding month, and was 4½° below the average. Very little rain fell between the 6th and 16th, and cold notherly winds were then prevalent. The last half of the month was generally cloudy and wet. On the 23rd nearly half an inch of rain fell in less than an hour.

Mean Pressure from the 3 daily observations	29.922	inches.
—— Temperature .... Ditto	58°.64	
—— Dew Point .... Ditto	53°.79	
—— Degree of Dryness ... Ditto	4°.85	
—— Degree of Moisture .. Ditto	.842	
—— Force of Vapour ..... Ditto	.413	inch.
Least observed degree of Moisture	.373	
Maximum Temperature in the Shade.....	80°.	
Minimum Temperature in ditto	36°.	
Maximum Temperature in the Sun	95°.	
Minimum of Terrestrial Radiation	28°.	
Mean Temperature of External Air	56°.23	

Winds.

North ....4 days	N. East ......4 days
South ....5 ..	S. East ......0 ..
East ....0 ..	N. West .....5 ..
West ....7 ..	S. West......5 ..

30 days.

Amount of Rain............ 2.45 inches.

JULY.

1841.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
Th.	1	30.080	61	60	1	Overcast	30.049	66	62	4	Overcast	30.049	60	60	—	Overcast
F.	2	—.086	63	63	—	Hazy	—.113	71	65	6	Do. & Fine	—.123	61	61	—	Slight Rain
○ S.	3	—.126	65	65	—	Ditto & Mild	—.096	76	63	13	Very Fine	29.989	59	59	—	Fine
S.	4	29.963	66	62	4	Very Fine	29.965	73	64	9	Fine	—.999	58	58	—	Cloudy
M.	5	30.064	64	64	—	Overcast & fine	30.062	75	65	10	Ditto	—.929	65	65	—	Overcast
T.	6	29.635	60	60	—	Rain	29.696	71	60	11	Ditto	—.805	57	57	—	Cloudy
W.	7	—.885	63	57	6	Fine	—.824	66	52	14	Ditto, cloudy	—.639	58	58	—	Rain
Th.	8	—.742	61	56	5	Ditto	—.823	66	55	11	Fine	—.898	55	55	—	Clear
F.	9	—.941	60	55	5	Light clouds	—.939	66	47	19	Very Fine	—.946	55	55	—	Cloudy
S.	10	—.926	63	46	17	Very Fine	—.823	73	60	13	Ditto	—.492	54	54	—	Rain
☾ S.	11	—.280	54	54	—	Cloudy	—.266	60	55	5	Overcast & fine	—.572	53	53	—	Overcast
M.	12	—.578	60	53	7	Fine	—.594	61	56	5	Cloudy & mild	—.585	52	52	—	Ditto
T.	13	—.630	60	56	4	Cloudy	—.638	67	55	12	Fine	—.719	53	53	—	Clear
W.	14	—.726	61	59	2	Very Fine	—.642	64	64	—	Showers	—.570	54	54	—	Cloudy
Th.	15	—.646	61	61	—	Fine	—.677	61	61	—	Heavy thund	—.742	53	53	—	Heavy rain, thun-
F.	16	—.874	59	59	—	Cloudy	—.913	62	60	2	Cloudy [Sho[s]	—.977	53	53	—	Clear [der.
S.	17	30.013	61	58	3	Fine [cast	—.964	70	57	13	Very Fine	—.820	54	54	—	Fine
● S.	18	29.634	59	59	—	Uniformly over-	—.691	63	58	5	Overcast	—.742	53	53	—	Ditto
M.	19	—.795	67	60	7	Very Fine	—.806	73	64	9	Fine	—.813	57	57	—	Cloudy
T.	20	—.699	57	57	—	Rain	—.578	60	60	—	Heavy Rain	—.493	56	56	—	Rain
W.	21	—.475	60	60	—	Overcast	—.469	62	62	—	Rain	—.665	56	56	—	Fine
Th.	22	—.724	60	55	5	Cloudy	—.730	66	60	6	Cloudy	—.828	53	53	—	Ditto
F.	23	—.915	60	51	9	Fine	—.948	65	50	15	Do. & Fine	—.999	56	56	—	Ditto
S.	24	30.085	57	55	2	Overcast	30.133	64	52	12	Ditto	30.128	56	56	—	Ditto
☽ S.	25	—.127	63	53	10	Ditto	—.080	70	54	16	Ditto	—.071	55	55	—	Clear
M.	26	—.074	60	60	—	Slight haze	—.053	74	68	6	Very Fine	—.022	55	55	—	Ditto
T.	27	29.990	69	65	4	Ditto & Fine	29.969	67	63	4	Overcast and	29.943	55	55	—	Ditto
W.	28	—.839	61	61	—	Slight Rain	—.784	71	62	9	Cloudy [Do.	—.774	52	52	—	Ditto
Th	29	—.760	58	50	8	Cold & Dry	—.729	64	55	9	Do. & Fine	—.722	53	53	—	Slight Rain
F.	30	—.695	58	53	5	Fine but cool	—.681	64	47	17	Ditto	—.621	51	51	—	Cloudy & Fine
S.	31	—.582	60	53	7	Fine	—.576	60	60	—	Rain	—622	48	48	—	Ditto
		29.826	60.99	57.29	3.70		29.816	66.80	58.58	8.22		29.816	55.16	55.16	0.00	

JULY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	63	59	66	59	SW	Little	.05
2	69	60	72	59	W	Ditto	.01
3	79	55	84	52	SW	Ditto	.04
4	69	53	72	52	——	Brisk	
5	75	57	80	57	NE	Little	.59
6	72	52	77	48	W	Brisk	.03
7	67	53	72	50	SW	Ditto	.08
8	67	45	72	40	W	Little	.01
9	71	44	76	38	——	Ditto	
10	71	49	76	49	SW	Ditto	.36
11	70	43	68	48	NW	Ditto	
12	64	44	68	41	W	Ditto	.02
13	68	42	74	36	——	Brisk	.02
14	66	45	75	40	SW	Little	.07
15	68	51	77	50	S	Ditto	1.46
16	72	44	76	41	N	Ditto	.01
17	75	49	80	46	S	Ditto	
18	75	48	84	45	NW	Ditto	
19	73	54	79	52	W	Ditto	.07
20	63	55	65	55	SW	Ditto	.29
21	67	54	70	51	——	Ditto	.10
22	67	51	72	48	W	Brisk	.22
23	64	53	71	50	NW	Little	.01
24	60	50	71	46	NE	Ditto	
25	68	51	77	48	——	Ditto	
26	72	53	78	49	SW	Ditto	
27	70	49	78	52	NW	Ditto	
28	72	47	76	44	SW	Brisk	
29	65	48	75	44	W	Strong	.01
30	63	48	75	44	NW	Little	
31	62	44	66	41	W	Brisk	.11
	68.61	50.00	74.06	47.58			3.56

Remarks.

The mean temperature advanced more than 4° in the month; but it was still 2° below the average. The amount of rain was upwards of an inch in excess. The quantity which fell on the 15th was remarkable, being very little short of an inch and a half and mostly as heavy thunder-showers. The morning was fine; but before noon the clouds, in dense dark masses, were observed to be in great commotion. The storm broke forth with great violence; and hail of large size fell to the westward. Towards night the rain set in heavy and constant, with more frequent but less violent occurrence of thunder and lightning.

Mean Pressure from the 3 daily observations 29.819 inches.
—— Temperature ....Ditto....... 60°.98
—— Dew Point ....Ditto....... 57°.01
—— Degree of Dryness ....Ditto....... 3°.97
—— Degree of Moisture....Ditto....... .872
—— Force of Vapour......Ditto....... .463 inch.
Least observed degree of Moisture........ .512
Maximum Temperature in the Shade ..... 79°.
Minimum Temperature in Ditto......... 42°.
Maximum Temperature in the Sun ..... 84°.
Minimum of Terrestrial Radiation ...... 36°.
Mean Temperature of External Air....... 59°.30

Winds.

North......1 days	N. East ....3 days
South ......2 ..	S. East.....0 ..
East ....0 ..	N. West....5 ..
West .....10 ..	S. West ...10 ..

31 days.

Amount of Rain .... 3.56 inches.

AUGUST.

Morning.							Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.790	60	60	—	Slight Rain	29.833	64	64	—	Slight showers	29.923	55	55	—	Cloudy & Fine
○ M.	2	—.937	60	58	2	Fine	—.910	61	58	3	Fine with clouds	—.765	57	57	—	Rain
T.	3	—.691	63	63	—	Hazy	—.630	73	65	8	Fine, Cloudy, mild	—.411	59	59	—	Ditto
W.	4	—.385	59	59	—	Rain	—.613	70	63	7	Cloudy	—.785	57	57	—	Fine
Th.	5	—.742	65	61	4	Fine	—.688	64	64	—	Slight Rain	—.609	57	57	—	Rain
F.	6	—.663	59	59	—	Overcast	—.777	66	56	10	Fine	—.851	59	59	—	Ditto
S.	7	—.893	62	60	2	Light clouds	—.873	71	63	8	Ditto	—.798	59	59	—	Overcast & Fine
S.	8	—.716	61	61	—	Rain	—.635	70	65	5	Ditto, Clouds	—.619	58	56	2	Overcast
M.	9	—.596	58	55	3	Fine	—.611	67	56	11	Very Fine	—.684	52	52	—	Clear
☾ T.	10	—.797	65	55	10	Ditto	—.800	69	57	12	Ditto	—.678	55	55	—	Rain
W.	11	— 463	62	62	—	Stormy & Wet	—.458	68	68	—	Cloudy	—.662	53	53	—	Ditto
Th.	12	—.888	59	54	5	Fine	—.923	62	50	12	Ditto	—.913	45	45	—	Clear
F.	13	—.886	58	58	—	Overcast	—.848	68	58	10	Cloudy	—.772	56	56	—	Overcast
S.	14	—.599	64	64	—	Rain	—.637	70	70	—	Showery	—.719	55	55	—	Clear
S.	15	—.709	65	63	2	Fine	—.687	67	58	9	Cloudy & Fine	—.746	54	54	—	Ditto
● M.	16	— 851	62	62	—	Slightly Overcast	—.886	72	65	7	Ditto	—.921	57	57	—	Ditto
T.	17	30.000	64	63	1	Overcast	—.969	74	67	7	Ditto	30.056	62	60	2	Overcast
W.	18	—.140	62	61	1	Hazy	30.147	75	62	13	Ditto	—.173	62	62	—	Do. & Fine
Th.	19	—.197	60	58	2	Very Fine	—.166	72	60	12	Very Fine	—.006	55	55	—	Clear
F.	20	29.628	62	60	2	Overcast	29.681	71	52	19	Ditto	29.734	58	58	—	Fine
S.	21	— 903	59	59	—	Fine	—.850	69	63	6	Cloudy	—.797	52	52	—	Clear
S.	22	—.800	56	56	—	Cloudy	—.870	65	65	—	Ditto	—.874	59	59	—	Slight Rain
☽ M.	23	—.797	57	57	—	Rain	—.850	68	55	13	Ditto & Fine	—.884	54	54	—	Overcast
T.	24	30.048	54	54	—	Clear	30.094	56	56	—	Showers	30.089	54	54	—	Clear
W.	25	—.079	59	59	—	Drizzly	—.059	62	62	—	Drizzly	—.079	60	60	—	Overcast
Th.	26	—.181	61	61	—	Hazy & Mild	—.225	74	72	2	Very Fine	—.213	62	62	—	Do. & Fine
F.	27	—.244	69	69	—	Heavy Dew	—.218	80	70	10	Cloudy & Hot	—.142	64	64	—	Ditto
S.	28	—.189	57	57	—	Foggy	—.171	70	65	5	Very Fine	—.125	58	58	—	Clear & Fine
S.	29	—.159	65	63	2	Slight Fog	—.050	78	70	8	Ditto	29.920	59	59	—	Ditto
M.	30	29 998	61	61	—	Foggy [Fine	29.921	75	66	9	Ditto	—.840	60	60	—	Ditto
T.	31	—.732	64	64	—	Cloudy Very	—.729	73	65	8	Overcast	—.844	54	54	—	Overcast
		29.858	61.03	59.87	1.16		29.864	69.16	62.26	6.90		29.859	56.80	56.67	0.13	

AUGUST.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	66	49	72	43	SW	Little	.02
2	70	58	75	58	——	Ditto	.38
3	73	57	77	58	——	Brisk	.38
4	69	57	72	55	N	Ditto	
5	64	57	72	56	SW	Ditto	.01
6	67	57	72	56	W	Ditto	.07
7	74	58	78	56	——	Ditto	
8	67	52	70	50	S	Little	.01
9	70	49	72	43	W	Ditto	.01
10	68	55	74	54	S	Brisk	.36
11	68	46	74	43	SW	Ditto	.30
12	65	41	74	36	NW	Little	
13	70	54	71	53	S	Ditto	.30
14	72	54	77	50	SW	Brisk	.04
15	70	50	77	46	——	Ditto	
16	74	58	80	52	S	Little	
17	75	56	80	53	W	Ditto	
18	76	56	81	53	——	Ditto	
19	77	47	82	42	SW	Ditto	
20	80	51	85	48	W	Brisk	
21	72	48	85	42	S	Little	
22	68	54	85	52	——	Brisk	.58
23	72	44	85	39	W	Little	.01
24	67	45	71	40	N	Ditto	.13
25	67	60	70	56	SW	Ditto	.07
26	79	62	83	60	——	Ditto	
27	81	51	86	48	——	Ditto	
28	77	52	90	48	W	Ditto	
29	81	51	101	50	SW	Ditto	
30	80	67	102	64	S	Ditto	
31	74	45	95	41	NW	Ditto	.02
	72.03	52.93	79.61	49.84			2.69

Remarks.

The weather still continued moist; but in this month an average temperature was fully maintained, south and south-west winds being prevalent. The mean height of the barometer was nearly $\frac{1}{10}$ of an inch lower than usual. The temperature during the days was below the average in the first half of the month; but the minimum at nights averaged higher than it generally does at this period of the season, which is to be accounted for in consequence of the clouded state of the atmosphere. A great change however took place in the last week, the mornings being then foggy, and the days hot.

Mean Pressure from the 3 daily observations 29.860 inches.
—— Temperature.........Ditto...... 62°.33
—— Dew Point...........Ditto...... 59°.60
—— Degree of Dryness....Ditto...... 2°.73
—— Degree of Moisture...Ditto...... .910
—— Force of Vapour.....Ditto...... .507 inch.
Least observed degree of Moisture...... .520
Maximum Temperature in the Shade.... 81°.
Minimum Temperature in ditto........ 41°.
Maximum Temperature in the Sun .... 102°.
Minimum of Terrestrial Radiation ..... 36°.
Mean Temperature of External Air ..... 62°.48

Winds.

North	2 days	N. East.....	0 days
South	7 ..	S. East......	0 ..
East........	0 ..	N. West	2 ..
West.......	8 ..	S. West.....	12 ..

31 days.

Amount of Rain .... 2.69 inches.

SEPTEMBER.

		Morning.					Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
○ W.	1	30.076	57	52	5	Cloudy & Fine	29.991	66	50	16	Very Fine	30.092	47	47	—	Clear
Th.	2	29.843	55	55	—	Slight Fog	—.757	69	62	7	Ditto	29.752	51	51	—	Do. & mild
F.	3	—.691	62	62	—	Very Fine	—.618	72	72	—	Showery	—.439	60	60	—	Rain
S.	4	—.444	51	51	—	Rain	—.622	49	49	—	Stormy & wet	—.775	44	44	—	Cloudy & Cold
S	5	—.823	53	46	7	Cloudy & fine	—.785	53	53	—	Rain	—.753	41	41	—	Foggy & Do.
M.	6	—.721	45	45	—	Dense Fog	—.704	60	50	10	Slight haze	—.725	44	44	—	Ditto
T.	7	—.734	55	55	—	Foggy	—.670	56	56	—	Rain	—.582	55	55	—	Cloudy
☾ W.	8	—.717	59	59	—	Fine	—.798	68	66	2	Fine	—.951	54	54	—	Ditto
Th.	9	30.019	58	58	—	Hazy	—.980	67	66	1	Overcast& Do.	—.959	60	58	2	Do. and Fine
F.	10	29.985	54	54	—	Ditto	—.999	70	68	2	Very Fine	30.002	56	56	—	Clear & Fine
S.	11	30.052	59	59	—	Foggy	30.042	69	65	4	Ditto	29.976	62	62	—	Ditto Ditto
S.	12	29.923	66	65	1	Very Fine	29.598	78	68	10	Ditto	—.820	61	61	—	Ditto
M.	13	—.843	65	65	—	Slight haze	—.838	78	73	5	Hot	—.815	63	63	—	Ditto
T.	14	—.803	64	62	2	Dry haze	—.589	78	70	8	Ditto	—.763	64	64	—	Cloudy
● W.	15	—.886	63	63	—	Very Fine	—.866	73	57	16	Very Fine	—.847	58	58	—	Rain
Th.	16	—.830	64	64	—	Ditto	—.820	66	60	6	Ditto	—.876	50	50	—	Clear
F.	17	—.967	52	52	—	Clear	—.954	65	50	15	Do., cloudless	—.913	47	47	—	Ditto
S.	18	—.903	49	49	—	Foggy	—.892	68	58	10	Ditto	—.897	49	49	—	Ditto
S.	19	—.996	52	52	—	Ditto	—.972	68	61	7	Ditto	30.037	59	59	—	Overcast
M.	20	30.109	62	62	—	Hazy & mild	30.096	70	65	5	Dry Haze	—.056	60	00	—	Ditto
T.	21	29.969	60	60	—	Hazy	29.849	66	65	1	Ditto	29.700	55	55	—	Clear and fine
☽ W.	22	—.619	60	60	—	Rain	—.627	70	62	8	Very Fine	—.613	56	56	—	Cloudy
Th.	23	—.617	56	56	—	Ditto	—.602	59	59	—	Heavy Rain	—.578	51	51	—	Do. and Rain
F.	24	—.526	57	57	—	Cloudy	—.514	62	62	—	Cloudy	—.480	53	53	—	Rain
S.	25	—.398	55	55	—	Heavy showers	—.435	62	62	—	Showery	—.481	54	54	—	Overcast & mild
S.	26	—.447	56	56	—	Cloudy	—.422	60	60	—	Ditto	—.480	53	53	—	Stormy with rain
M.	27	—.471	55	55	—	Overcast	—.567	68	65	3	Fine	—.512	55	55	—	Ditto, lightning
T.	28	—.328	60	60	—	Rain	—.310	64	64	—	Rain	—.381	65	65	—	Cloudyboisterous
W.	29	—.167	59	59	—	Boisterous	—.267	63	60	3	Boisterous	—.200	55	55	—	Clear & Fine
⊙ Th.	30	—.177	58	58	—	Slight Rain	—.172	62	62	—	Do. with Rain	—.413	52	52	—	Ditto
		29.736	57.36	56.86	0.50		29.711	65.96	61.33	4.63		29.728	54.46	54.40	0.06	

SEPTEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	72	36	90	32	S	Little	
2	73	48	91	42	——	Brisk	
3	72	50	89	49	SW	Little	.48
4	55	41	90	39	W	Strong	.32
5	56	36	62	31	E	Little	.04
6	61	37	72	36	S	Ditto	
7	62	49	65	46	——	Ditto	.17
8	70	51	88	47	SW	Ditto	
9	68	56	72	54	S	Ditto	
10	74	55	92	53	SW	Ditto	
11	78	54	93	52	NE	Ditto	
12	84	56	104	54	SE	Ditto	
13	79	59	98	56	E	Ditto	
14	78	55	96	50	SE	Ditto	
15	66	55	97	52	S	Brisk	.06
16	71	41	90	36	——	Little	.01
17	69	41	90	36	W	Ditto	
18	72	40	90	33	S	Ditto	
19	74	54	94	51	E	Ditto	
20	71	60	89	58	SE	Ditto	
21	70	56	87	54	E	Brisk	.10
22	70	52	90	50	S	Ditto	.30
23	66	49	70	46	——	Little	.23
24	64	50	69	46	SW	Ditto	.25
25	65	50	77	48	——	Ditto	.30
26	64	50	69	48	S	Brisk	.27
27	67	54	83	52	W	Ditto	.57
28	64	56	65	53	S	Little	.15
29	65	54	79	50	——	Strong	.35
30	65	44	66	40	SW	Ditto	.11
	68.83	49.66	83.56	46.46			3.71

Remarks.

This month was warmer than usual and more moist. The mean temperature was upwards of 2° above the average; and the amount of rain was nearly an inch excess. The barometer was low throughout. During the first three weeks there were however intervals of dry weather, favourable for the process of ripening; but from the 21st to the end of the month there was not one wholly dry day. Upwards of 2½ inches of rain fell in the last 10 days. The 27th was stormy with heavy rain and much lightning at night. The 28th and 29th were boisterous.

Mean Pressure from the 3 daily observations 29.725 inches.
—— Temperature .... Ditto ...... 59°.26
—— Dew Point .... Ditto ...... 57°.53
—— Degree of Dryness .... Ditto ...... 1°.73
—— Degree of Moisture .. Ditto ...... .934
—— Force of Vapour ..... Ditto ...... .468 inch.
Least observed degree of Moisture ...... .571
Maximum Temperature in the Shade .... 84°.
Minimum Temperature in ditto .... 36°.
Maximum Temperature in the Sun ...... 104°.
Minimum of Terrestrial Radiation ...... 31°.
Mean Temperature of External Air ..... 59°.44

WINDS.

North...... 0 days	N. East ....1 days
South......13 ..	S. East ....3 ..
East........4 ..	N. West....0 ..
West...... 3 ..	S. West ....6 ..

30 days.

Amount of Rain..................3.71 inches.

OCTOBER.

1841.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
F.	1	29.424	53	53	—	Thick Haze	29 437	61	61	—	Overcast	29.598	53	53	—	Cloudy
S.	2	—.730	49	49	—	Fine	—.745	59	51	8	Very Fine	—.773	59	59	—	Ditto & Fine
S.	3	—.792	53	50	3	Cloudy & Do.	—.749	58	58	—	Cloudy	—.745	54	54	—	Ditto
M.	4	—.703	55	55	—	Fine	—.567	55	55	—	Ditto	—.329	55	55	—	Overcast
T.	5	—.124	54	54	—	Cloudy	—.050	59	59	—	Cloudy	28.888	50	50	—	Rain
W.	6	28.808	50	50	—	Fine	28.809	58	54	4	Ditto	—.925	46	46	—	Clear & Fine
☾ Th.	7	—.991	53	53	—	Ditto	29.018	59	54	5	Fine	29.038	50	50	—	Overcast, rain
F.	8	29 147	52	52	—	Overcast	—.224	56	56	—	Slight rain	—.027	48	48	—	Clear
S.	9	—.712	50	50	—	Ditto	—.776	56	50	6	Cloudy	—.872	46	46	—	Cloudy
S.	10	—.835	54	53	1	Slightly Ditto	—.799	57	57	—	Slight rain	—.612	55	55	—	Overcast
M.	11	—.596	54	54	—	Fine	—.596	60	48	12	Very Fine	—.441	50	50	—	Rain
T.	12	—.234	49	49	—	Clearing	—.202	54	54	—	Heavy showers	—.596	46	46	—	Clear & Fine
W.	13	—.859	49	49	—	Light clouds	—.973	55	44	11	Fine	—.912	54	54	—	Stormy, Rain
● Th.	14	—.812	59	59	—	Cloudy, boisterous	—.821	63	60	3	Cloudy	—.698	56	56	—	Overcast
F.	15	—.492	55	53	2	Light clouds	—.561	59	59	—	Rain	—.799	54	53	1	Ditto
S.	16	—.520	50	50	—	Heavy Rain	—.349	59	59	—	Densely clouded	—.519	52	52	—	Clear
S.	17	—.519	53	53	—	Densely Overcast	—.444	62	60	2	Cloudy & Fine	—.409	50	50	—	Stormy
M.	18	—.591	51	46	5	Clear & Windy	—.829	55	40	15	Fine	—.805	47	47	—	Slight Rain
T.	19	—.524	48	48	—	Cloudy	—.798	54	46	8	Ditto	—.962	43	43	—	Clear
W.	20	—.911	42	42	—	Clear	—.805	54	46	8	Ditto	—.611	49	49	—	Boisterous
Th.	21	—.818	42	42	—	Ditto	—.988	50	38	12	Ditto, Clear	30.162	32	32	—	Frosty
☽ F.	22	30.124	34	34	—	Frosty Haze	30.050	50	43	7	Overcast	29.861	44	44	—	Overcast
S.	23	29.449	55	55	—	Cloudy	29.316	58	58	—	Rain	—.034	50	50	—	Cloudy
S.	24	28 924	50	50	—	Heavy clouds	28.947	52	49	3	Cloudy, Fine	28.964	37	37	—	Clear
M.	25	29 061	43	43	—	Densely Overcast	29 111	52	47	5	Ditto	29.234	34	34	—	Foggy
T.	26	—.318	38	38	—	Foggy	—.358	50	45	5	Hazy clouds	—.460	47	47	—	Stormy, Rain
W.	27	—.465	47	42	5	Boisterous	—.406	47	47	—	Heavy rain	—.458	48	48	—	Ditto
Th	28	—.601	47	47	—	Rain	—.680	49	49	—	Rain	—.820	45	45	—	Overcast
F.	29	—.818	47	44	3	Flying clouds	—.804	48	48	—	Slight drizzle	—.766	49	49	—	Ditto
☉ S.	30	—.776	45	45	—	Rain	—.721	48	48	—	Overcast & Do.	—.730	48	48	—	Ditto
S.	31	—.798	49	49	—	Drizzly	—.818	55	55	—	Overcast	—.877	49	49	—	Hazy
		29.531	49.36	48.74	0.61		29.540	52.22	51.55	3.67		29.545	48.38	48.35	0.03	

OCTOBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	64	43	73	40	N	Little	.20
2	63	42	72	37	W	Ditto	
3	63	51	79	49	NW	Ditto	.13
4	61	49	79	47	NE	Ditto	.36
5	62	43	59	43	S	Brisk	.22
6	61	41	68	37	W	Ditto	.04
7	61	45	70	41	SW	Ditto	.04
8	57	45	68	40	——	Ditto	.03
9	57	42	66	39	W	Little	.03
10	59	50	64	47	S	Ditto	.21
11	63	45	68	43	SW	Brisk	.34
12	57	42	58	40	W	Ditto	.24
13	58	50	64	48	NW	Ditto	.04
14	64	53	68	50	SW	Ditto	.02
15	60	41	75	37	NW	Brisk	.50
16	58	42	58	39	W	Ditto	.04
17	63	48	64	47	——	Strong	.01
18	58	43	60	41	——	Brisk	.42
19	51	31	60	29	NW	Ditto	
20	56	37	60	33	SW	Ditto	.04
21	50	26	64	22	W	Little	
22	57	38	60	33	SE	Ditto	.01
23	57	45	59	42	S	Brisk	.21
24	56	31	59	27	W	Ditto	
25	54	35	56	29	SW	Little	.01
26	51	42	52	41	NE	Ditto	.11
27	49	45	49	45	——	Brisk	.92
28	48	43	48	40	——	Ditto	.10
29	50	45	50	44	——	Ditto	.09
30	49	45	50	45	——	Ditto	.06
31	53	44	53	44	SE	Ditto	.19
	57.09	42.64	62.35	39.96			4.61

Remarks.

This was an exceedingly wet month the amount of rain being upward of 4½ inches. There were only 4 days on which rain did not fall. The barometer was remarkably low on the 6th, 7th and 24th; and its average height was lower than in any month during the preceding 15 years at least. On the 18th the tide at Chiswick rose higher than it has done since the 28th December, 1821. The mean temperature was about a degree below the average. Frost at night occurred only twice; that on the 21st was such as to destroy the Dahlia flowers. The ground was so deluged as to be rendered totally unfit for being properly worked; and for most garden operations the weather was very unfavourable.

Mean Pressure from the 3 daily observations 29.538 inches
—— Temperature .... Ditto ...... 49°.98
—— Dew Point .... Ditto ...... 49°.55
—— Degree of Dryness ... Ditto ...... 1°.43
—— Degree of Moisture ... Ditto ...... .970
—— Force of Vapour ..... Ditto ...... .355 inch.
Least observed degree of Moisture ...... .581
Maximum Temperature in the Shade .... 64°.
Minimum Temperature in ditto .... 26°.
Maximum Temperature in the Sun ...... 79°.
Minimum of Terrestrial Radiation ...... 22°.
Mean Temperature of External Air ..... 49°.86

Winds.

North.......1 days.	N. East......6 days.
South...... 3 ..	S. East ......2 ..
East.........0 ..	N. West .....4 ..
West........9 ..	S. West......6 ..

31 days.

Amount of Rain................4.61 inches.

NOVEMBER.

		Morning.					Noon.					Night.				
1841.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
M.	1	29.901	46	46	—	Rain	29.931	49	49	—	Drizzly	30.063	47	47	—	Overcast
T.	2	30.187	46	46	—	Hazy	30.194	51	48	3	Fine	—.226	43	43	—	Foggy
W.	3	—.309	44	44	—	Foggy	—.316	52	48	4	Hazy	—.369	46	46	—	Ditto
Th.	4	—.372	44	44	—	Ditto	—.340	48	48	—	Light Haze	—.370	46	46	—	Overcast
F.	5	—.341	45	45	—	Hazy	—.351	49	49	—	Hazy	—.379	47	45	2	Ditto
☾ S.	6	—.391	49	48	1	Light haze	—.366	52	50	2	Very Fine	—.379	39	39	—	Clear
S.	7	—.391	47	47	—	Ditto	—.379	51	49	2	Ditto	—.351	43	43	—	Foggy
M.	8	—.333	46	46	—	Foggy	—.306	51	51	—	Ditto	—.318	43	43	—	Slightly overcast
T.	9	—.291	43	40	3	Overcast	—.271	48	46	2	Overcast	—.198	48	48	—	Ditto & windy
W.	10	—.127	50	45	5	Ditto	—.142	53	47	6	Ditto & Fine	—.061	51	51	—	Ditto
Th.	11	29.976	49	40	9	Slightly Ditto	29.962	55	50	5	Very Fine	29.934	43	43	—	Ditto
F.	12	—.561	51	51	—	Slight Rain	—.516	51	51	—	Showery	—.515	39	39	—	Clear
● S.	13	—.430	41	37	4	Cloudy	—.431	46	32	14	Clear & Fine	—.102	35	35	—	Rain
S.	14	—.050	35	35	—	Rain	—.135	42	42	—	Stormy	—.480	34	34	—	Clear
M.	15	—.479	28	28	—	Frosty	—.365	39	39	—	Hazy	—.307	35	35	—	Sleet
T.	16	—.431	30	30	—	Ditto & Clear	—.490	33	33	—	Clear	—.588	27	27	—	Clear
W.	17	—.700	22	22	—	Sharp Frost	—.665	35	35	—	Ditto	—.414	35	35	—	Overcast
Th.	18	—.316	35	35	—	Stormy, sleet	—.372	39	39	—	Cloudy & Cold	—.666	34	34	—	Ditto
F.	19	—.474	44	44	—	Densely Overcast	—.266	47	47	—	Rain	—.393	37	37	—	Clear
S.	20	—.375	35	35	—	Foggy	—.230	50	50	—	Overcast	—.195	47	47	—	Cloudy
☽ S.	21	—.382	46	46	—	Rain	—.316	55	55	—	Stormy with rain	—.291	54	54	—	Stormy, rain
M.	22	—.170	55	55	—	Ditto	—.185	57	55	2	Cloudy	—.455	43	43	—	Clear
T.	23	—.656	38	38	—	Clear	—.659	47	42	5	Ditto	—.736	41	40	1	Overcast
W.	24	—.957	33	33	—	Ditto	—.891	45	38	7	Clear & Fine	—.881	32	32	—	Cloudy
Th	25	—.783	32	32	—	Light clouds	—.786	42	38	4	Ditto	—.913	31	31	—	Frosty
F.	26	—.894	31	31	—	Frosty & foggy	—.839	36	36	—	Foggy	—.798	41	40	1	Slightly overcast
S.	27	—.697	42	42	—	Foggy	—.619	51	51	—	Hazy	—.583	51	51	—	Rain
○ S.	28	—.634	44	44	—	Hazy & damp	—.564	51	51	—	Cloudy	—.464	47	47	—	Heavy Rain
M.	29	—.176	52	52	—	Heavy Rain	—.166	55	55	—	Slightly overcast	28.948	55	55	—	Ditto
T.	30	28.899	54	54	—	Boisterous	28.845	55	55	—	Boisterous	29.250	48	48	—	Clear
		29.756	41.90	41.17	0.73		29.729	47.83	45.90	1.87		29.754	42.06	41.93	0.13	

NOVEMBER.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	52	45	60	44	W	Little	.10
2	55	37	65	35	NE	Ditto	
3	55	36	65	34	E	Ditto	
4	48	40	49	36	——	Ditto	
5	50	44	50	41	SE	Ditto	
6	58	35	72	31	S	Ditto	
7	53	37	69	33	W	Ditto	
8	51	39	73	38	SW	Ditto	.01
9	50	45	52	43	——	Brisk	
10	53	44	59	41	W	Ditto	
11	55	35	60	33	——	Little	.40
12	63	32	66	29	——	Brisk	.06
13	48	34	70	30	——	Ditto	.27
14	41	23	70	18	NW	Strong	.04
15	37	25	39	22	SE	Little	.04
16	35	15	50	10	W	Ditto	
17	39	32	41	29	SE	Ditto	.12
18	42	25	44	20	NE	Ditto	.12
19	47	27	46	24	SE	Ditto	.24
20	52	40	52	38	S	Ditto	.18
21	55	51	54	49	——	Strong	.30
22	58	31	62	26	SW	Brisk	.21
23	47	26	52	24	S	Ditto	
24	45	27	52	24	NW	Little	
25	44	23	62	20	——	Ditto	
26	47	37	48	35	E	Ditto	.02
27	51	42	51	40	SW	Ditto	.11
28	54	43	59	42	——	Brisk	.60
29	58	49	60	47	——	Strong	.54
30	54	40	55	37	——	Ditto	.05
	49.90	35.30	56.90	32.43			3.41

Remarks.

The weather was hazy up to the 10th, but with little rain. From this date to the end of the month there were only four dry days, the amount of rain being nearly an inch higher than usual. The mean temperature was about a degree above the average. Westerly winds were prevalent. The 16th was clear and cold with severe frost at night. The 14th and 18th were stormy with rain and sleet. Much rain fell on the 28th and 29th; the 30th was boisterous, the barometer at the same time falling very low. Many of the grounds adjoining the Thames were flooded to an unusual extent in consequence of the state of the weather on these days and the previously saturated condition of the earth.

Mean Pressure from the 3 daily observations 29.746 inches
—— Temperature..........Ditto...... 43°.93
—— Dew Point............Ditto...... 43°.02
—— Degree of Dryness......Ditto...... 0°.91
—— Degree of Moisture.....Ditto...... .966
—— Force of Vapour.......Ditto...... .280 inch.
Least observed degree of Moisture........ .594
Maximum Temperature in the Shade...... 63°.
Minimum Temperature in ditto.. .... 15°.
Maximum Temperature in the Sun........ 73°.
Minimum of Terrestrial Radiation........ 10°.
Mean Temperature of External Air....... 42°.60

Winds.

North........0 days	N. East......2 days
South........5 ..	S. East.......3 ..
East..........3 ..	N. West......3 .
West........7 ..	S. West......7 ..

30 days.

Amount of Rain ....3.41 inches.

DECEMBER.

1841.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
W.	1	29.536	45	45	—	Slightly overcast	29.301	51	51	—	Overcast	29.350	48	48	—	Overcast
Th.	2	—.437	45	45	—	Cloudy, damp	—.416	52	52	—	Cloudy	—.207	49	49	—	Rain
F.	3	—.246	46	45	1	Fine	28.948	52	52	—	Rain	—.174	47	45	2	Clear
S.	4	—.922	42	39	3	Clear	29.297	48	48	—	Heavy Ditto	—.705	48	48	—	Densely Cloudy
☾ S.	5	—.938	45	42	3	Cloudy	—.990	49	45	4	Clear & Fine	30.038	47	47	—	Ditto
M.	6	—.761	50	50	—	Overcast	—.582	52	52	—	Heavy Rain	29.757	42	42	—	Clear
T.	7	—.863	39	39	—	Clear	—.868	48	48	—	Clear	—.793	50	50	—	Overcast
W.	8	—.475	51	51	—	Rain	—.391	54	54	—	Cloudy	—.478	47	45	2	Cloudy
Th.	9	—.865	37	37	—	Clear	—.763	44	44	—	Very Fine	—.708	42	42	—	Rain
F.	10	—.376	52	52	—	Overcast	—.252	54	54	—	Rain	—.659	43	40	3	Clear
S.	11	—.879	39	39	—	Slightly Ditto	—.891	46	43	3	Clear	—.913	40	38	2	Cloudy
● S.	12	—.660	46	46	—	Rain	—.566	52	52	—	Overcast, stormy	—.515	52	52	—	Ditto
M.	13	—.350	50	50	—	Ditto	—.289	51	51	—	Cloudy	—.238	44	44	—	Clear
T.	14	—.490	42	42	—	Cloudy	—.690	41	39	2	Ditto & Cold	30.033	32	32	—	Ditto
W.	15	—.907	42	42	—	Overcast	—.783	48	48	—	Densely overcast	29.510	48	48	—	Cloudy
Th.	16	—.419	40	40	—	Slightly Ditto	—.278	45	45	—	Very Fine	—.266	37	37	—	Clear
F.	17	—.461	32	32	—	Clear & Frosty	—.529	37	37	—	Fine	—.609	27	27	—	Do. & Frosty
S.	18	—.585	25	25	—	Frosty	—.503	30	30	—	Frosty, Haze	—.402	26	26	—	Ditto
S.	19	—.270	25	25	—	Ditto	—.188	32	32	—	Slight Snow	—.190	31	31	—	Overcast
M.	20	—.218	29	29	—	Ditto	—.252	32	32	—	Frosty, Fine	—.444	29	29	—	Slightly Do.
☽ T.	21	—.599	29	27	2	Clear	—.653	33	33	—	Clear	—.676	32	32	—	Clear
W.	22	—.770	29	29	—	Slight Frost	—.782	37	37	—	Cloudy	—.851	34	34	—	Drizzly
Th.	23	—.827	38	38	—	Hazy	—.793	44	44	—	Drizzly	—.854	39	34	5	Cloudy, Fine
F	24	30.016	44	44	—	Overcast	—.967	47	47	—	Rain	—.902	49	49	—	Overcast
S.	25	29.769	44	44	—	Ditto, Rain	—.687	44	44	—	Overcast	—.657	31	31	—	Clear
S.	26	—.755	31	31	—	Overcast	—.841	30	30	—	Clear	—.944	32	32	—	Cloudy
M.	27	30.099	31	31	—	Foggy	30.121	34	34	—	Hazy	30.084	33	33	—	Ditto
○ T.	28	—.063	36	36	—	Ditto	—.059	43	43	—	Light Clouds	—.054	43	40	3	Ditto & Fine
W.	29	—.078	43	43	—	Drizzly	—.058	43	43	—	Dense Fog	—.035	41	41	—	Slight Rain
Th.	30	—.084	35	35	—	Hazy	29.927	42	42	—	Hazy	—.166	38	38	—	Overcast
F.	31	—.211	35	35	—	Fine	30.195	40	35	5	Very Fine	—.187	37	37	—	Ditto
		29.707	39.25	38.96	0.29		29.640	43.71	43.26	0.45		29.690	39.93	39.38	0.55	

DECEMBER.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	54	43	61	41	SE	Little	.08
2	53	46	54	44	S	Ditto	.12
3	54	43	55	41	SW	Brisk	.17
4	49	40	50	37	——	Ditto	.13
5	50	37	56	33	W	Little	.14
6	52	35	55	32	SW	Brisk	.30
7	50	47	55	44	W	Little	.15
8	54	33	58	28	——	Brisk	.01
9	44	38	53	37	——	Little	.15
10	55	36	56	34	SW	Strong	.07
11	47	37	48	33	W	Brisk	.09
12	52	47	52	47	SW	Ditto	.17
13	52	40	52	38	——	Little	.08
14	42	27	43	22	N	Brisk	
15	50	37	52	35	S	Ditto	.10
16	49	30	55	25	W	Little	
17	39	17	43	12	——	Ditto	
18	35	16	36	9	NE	Ditto	
19	37	27	37	22	——	Brisk	
20	39	20	52	16	——	Little	
21	35	26	49	22	W	Brisk	
22	37	33	40	31	——	Ditto	.02
23	46	27	48	24	SW	Little	.06
24	50	42	50	41	——	Brisk	.12
25	49	22	52	19	——	Ditto	.06
26	39	24	42	23	——	Ditto	.01
27	36	25	37	22	W	Little	.02
28	44	37	46	35	NW	Ditto	.02
29	45	39	45	27	——	Ditto	.05
30	42	31	42	27	SE	Ditto	
31	40	33	41	31	——	Ditto	
	45.80	33.38	48.87	30.07			2.12

Remarks.

The weather still continued wet up to the 13th; from this to the 21st it was generally frosty at night, and again wet every day to the 29th. The mean temperature was 1° above the average. The amount of rain was half an inch in excess. The mean height of the barometer, as in every preceding month of the year, was below the average. Except in very few instances the air was found to be constantly saturated with moisture. West and SW. winds were prevalent.

This has been the wettest season of any since 1826 at least, the time when these Journals were commenced.

Mean Pressure from the 3 daily observations	29.679 inches.
—— Temperature..........Ditto......	40°.96
—— Dew Point.............Ditto......	40°.53
—— Degree of Dryness......Ditto......	0°.43
—— Degree of Moisture.....Ditto......	.984
—— Force of Vapour........Ditto......	.255 inch.
Least observed degree of Moisture........	.828
Maximum Temperature in the Shade......	55°.
Minimum Temperature in ditto..........	16°.
Maximum Temperature in the Sun........	61°.
Minimum of Terrestrial Radiation........	9°.
Mean Temperature of External Air.......	39°.59

Winds.

North..........	1 days	N. East........	3 days
South..........	2 ..	S. East..........	3 ..
East............	0 ..	N. West.........	2 ..
West..........	10 ..	S. West........	10 ..

31 days.

Amount of Rain ....2.12 inch.

Monthly Mean Pressure, Temperature, and Dew Point, &c. of 1841; deduced from the Observations recorded in the preceding Journal.

1841.	Pressure.							
					Mean at			
Months.	Max.	Min.	Med.	Range of Barom.	Morn.	Noon.	Night.	Mean of the three Observations.
Jan. .	30.505	28.864	29.757	1.641	29.773	29.773	29.770	29.772
Feb. .	30.346	29.071	29.770	1.275	29.785	29.772	29.748	29.768
March	30.512	29.525	29.912	0.987	29.903	29.895	29.886	29.895
April	30.171	29.371	29.838	0.800	29.834	29.834	29.842	29.839
May .	30.364	29.253	29.860	1.111	29.856	29.851	29.869	29.858
June.	30.357	29.494	29.922	0.863	29.931	29.919	29.917	29.923
July .	30.133	29.266	29.820	0.867	29.826	29.816	29.816	29.819
Aug.	30.244	29.385	29.859	0.859	29.858	29.864	29.859	29.860
Sept.	30.109	29.167	29.724	0.942	29.736	29.711	29.728	29.725
Oct. .	30.162	28.808	29.537	1.354	29.531	29.540	29.545	29.538
Nov. .	30.391	28.845	29.750	1.546	29.756	29.729	29.754	29.746
Dec. .	30.211	28.948	29.679	1.263	29.707	29.640	29.690	29.679
Aver.	30.292	29.166	29.785	1.125	29.791	29.778	29.785	29.785

1841.	Temperature.											
	In the Shade.			Mean at			Mean of the three Observs.	In Sun's Rays.		Terrestrial Radiation.		Med. of Sun and Radn.
Months.	Max.	Min.	Med.	Morn.	Noon.	Night.		Max.	Min.	Min.	Max.	
Jan. .	53	6	34.25	33.13	38.58	33.87	35.19	56	22	44	1	32.73
Feb. .	56	14	36.60	35.64	40.39	35.64	37.22	62	27	43	8	36.65
March	67	27	46.35	43.48	54.74	42.45	46.89	74	42	47	22	46.69
April	76	26	47.09	47.23	55.26	44.20	48.90	81	26	51	20	48.23
May .	82	36	58.09	59.74	67.19	53.26	60.06	96	62	59	32	61.50
June.	80	36	56.23	58.56	65.23	52.13	58.64	95	56	53	28	58.90
July .	79	42	59.30	60.99	66.80	55.16	60.98	84	65	59	36	60.82
Aug.	81	41	62.48	61.03	69.16	56.80	62.33	102	70	64	36	64.72
Sept.	84	36	59.44	57.36	65.96	54.46	59.26	104	65	58	31	65.01
Oct. .	64	26	49.86	49.36	52.22	48.38	49.98	79	48	50	22	51.15
Nov. .	63	15	42.60	41.90	47.83	42.06	43.93	73	39	49	10	49.66
Dec. .	55	16	39.59	39.25	43.71	39.93	40.96	61	36	47	9	39.47
Aver.	70.00	26.75	49.32	48.97	55.59	46.52	50.36	80.58	46.50	52.00	21.08	51.29

1841.	Hygrometer indicating Dew Point.								Scale of the Winds.									Rain.
	Mean Dew Point at																	
Months.	Morn.	Noon.	Night.	Mean Dew Point.	Mean Force of Vapour.	Mean degree of Dryness.	Mean degree of Moisture.	Least degree of Moisture.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Days.	In. Pts.
Jan. .	33.00	37.16	33.58	34.58	.200	0.61	976	708	5	2	2	3	1	6	7	5	31	2.60
Feb. .	34.75	37.21	35.21	35.72	.213	1.50	942	533	1	11	3	2	5	3	1	2	28	0.76
March	43.26	47.71	42.29	44.42	.295	2.47	916	546	0	0	1	1	9	13	6	1	31	1.32
April	44.90	44.03	44.03	44.32	.294	4.58	847	432	1	9	1	0	2	7	5	5	30	1.58
May .	55.26	55.39	53.13	54.59	.423	5.47	821	410	1	7	3	1	5	11	2	1	31	2.16
June.	53.93	55.47	51.97	53.79	.413	4.85	842	373	4	4	0	0	5	5	7	5	30	2.45
July .	57.29	58.58	55.16	57.01	.463	3.97	872	512	1	3	0	0	2	10	10	5	31	3.56
Aug.	59.87	62.26	56.67	59.60	.507	2.73	910	520	2	0	0	0	7	12	8	2	31	2.69
Sept.	56.86	61.33	54.40	57.53	.468	1.73	934	571	0	1	4	3	13	6	3	0	30	3.71
Oct.	48.74	51.55	48.35	49.55	.355	0.43	970	581	1	6	0	2	3	6	9	4	31	4.61
Nov.	41.17	45.90	41.93	43.02	.280	0.91	966	594	0	2	3	3	5	7	7	3	30	3.41
Dec. .	38.96	43.26	39.38	40.53	.255	0.43	984	828	1	3	0	3	2	10	10	2	31	2.12
Aver.	47.33	49.98	46.34	47.88	.347	2.48	915	550	17	48	17	18	59	96	75	35	365	30.97

The preceding Table, as regards Temperature, and the Dew Point, is in terms of Fahrenheit's scale; the following are reductions of the same to those of the Centigrade and Reaumur's Thermometers.

Centigrade Thermometer.

1841.	Temperature.												Hygrometer indicating Dew Point.				
	In the Shade.			Mean at			Mean of the three Observations	In Sun's Rays.		Terrestrial Radiation.		Med. of Sun and Radiation.	Mean Dew Point at			Mean Dew Point.	Mean degree of Dryness.
Months.	Max.	Min.	Med.	Morn.	Noon.	Night.		Max.	Min.	Max.	Min.		Morn.	Noon.	Night.		
Jan.	11.66	−14.44	1.25	0.62	3.65	1.03	1.77	13.33	−5.55	6.66	−18.33	0.40	0.55	2.86	0.87	1.43	0.33
Feb.	13.33	−10.00	2.55	2.02	4.66	2.02	2.90	16.66	−2.77	6.11	−13.33	2.38	1.52	2.89	1.78	2.06	0.83
March	19.44	−2.77	7.97	6.37	12.63	5.80	8.27	23.33	5.55	8.33	−5.55	8.16	6.25	8.72	5.71	6.90	1.37
April	24.44	−3.33	8.38	8.46	12.92	6.77	9.38	27.22	−3.33	10.55	−6.66	9.01	7.16	6.68	6.68	6.84	2.54
May	27.77	2.22	14.49	15.41	19.55	11.81	15.58	35.55	16.66	15.00	0.00	16.38	12.92	12.94	11.73	12.55	3.03
June	26.66	2.22	13.46	14.75	18.46	11.18	14.80	35.00	13.33	11.66	−2.22	14.94	12.18	13.03	11.09	12.10	2.69
July	26.11	5.55	15.16	16.04	19.33	12.86	16.09	28.88	18.33	15.00	2.22	16.01	14.05	14.76	12.86	13.89	2.20
Aug.	27.22	5.00	16.93	16.12	20.64	13.77	16.85	38.88	21.11	17.77	2.22	18.17	15.48	16.81	13.70	15.33	1.51
Sept.	28.88	2.22	15.21	14.08	18.87	12.47	15.14	40.00	18.33	14.44	−0.55	18.33	13.81	16.28	12.44	14.18	0.23
Oct.	17.77	−3.33	9.92	9.64	11.23	9.10	9.98	26.11	8.88	10.00	−5.55	10.63	9.30	10.86	9.08	9.75	0.79
Nov.	17.22	−9.44	5.88	5.50	8.79	5.58	6.62	22.77	3.88	9.44	−12.22	9.81	5.09	7.72	5.51	6.12	0.50
Dec.	12.77	−8.88	4.21	4.02	6.50	4.40	4.97	16.11	2.22	8.33	−12.77	4.15	3.86	6.25	4.10	4.73	0.23
Aver.	21.11	−2.91	9.62	9.42	13.10	8.06	11.19	26.98	8.06	11.11	−6.06	10.71	8.51	9.98	7.96	8.82	1.36

Reaumur's Thermometer.

1841.	Temperature.												Hygrometer indicating Dew Point.				
	In the shade.			Mean at			Mean of the three Observations.	In Sun's Rays.		Terrestrial Radiation.		Med. of Sun and Radiation.	Mean Dew Point at			Mean Dew Point.	Mean degree of dryness.
Months.	Max.	Min.	Med.	Morn.	Noon.	Night.		Max.	Min	Max.	Min.		Morn.	Noon.	Night.		
Jan.	9.33	−11.55	1.00	0.49	2.92	0.82	1.42	10.66	−4.44	5.33	−14.66	0.32	0.44	2.29	0.70	1.14	0.27
Feb.	10.66	−8.00	2.04	1.61	3.73	1.61	2.32	13.33	−2.22	4.88	−10.66	2.06	1.16	2.32	1.42	1.65	0.66
March.	15.55	−2.22	6.38	5.10	10.11	4.64	6.62	18.66	4.44	6.66	−4.44	6.52	5.00	6.97	4.56	5.51	1.09
April.	19.55	−2.66	6.70	6.77	10.33	5.41	7.51	21.77	−2.66	8.44	−5.33	7.21	5.72	5.35	5.34	5.47	2.03
May	22.22	1.77	11.69	12.33	15.64	9.44	12.47	28.44	13.33	12.00	0.00	13.11	10.33	10.39	9.38	10.03	2.43
June.	21.33	1.77	10.76	11.80	14.77	8.94	11.84	28.00	10.66	9.33	−1.77	11.95	9.74	10.42	8.87	9.68	2.15
July	20.88	4.44	12.12	12.84	15.46	10.28	12.87	23.11	14.66	12.00	1.77	12.80	11.24	11.81	10.29	11.11	1.76
Aug.	21.77	4.00	13.55	12.89	16.52	11.01	13.48	31.11	16.88	14.22	1.77	14.54	12.39	13.44	10.96	12.26	1.21
Sept.	23.11	1.88	12.16	11.26	15.10	10.22	12.11	32.00	14.66	11.55	−0.44	14.67	11.04	13.03	9.95	11.34	0.76
Oct.	14.22	−2.66	7.94	7.72	8.99	7.28	7.98	20.88	7.11	8.00	−4.44	8.51	7.44	8.69	7.26	7.79	0.19
Nov.	13.77	−7.55	4.71	4.40	7.04	4.71	5.29	18.22	3.11	7.55	−9.77	7.84	4.07	6.17	4.41	4.88	0.40
Dec.	10.22	−7.11	3.36	3.21	5.20	3.52	3.98	12.88	1.77	6.66	−10.22	3.31	3.09	5.00	3.27	3.78	0.19
Aver.	16.88	−2.33	7.70	7.54	10.49	6.45	8.16	21.56	6.44	8.88	−4.84	8.57	6.80	7.99	6.37	7.05	1.09

II. *On the Oxalis Deppei, and its Cultivation as a culinary plant. By Mr.* Robert Thompson, *Superintendent of the Orchard and Kitchen Garden Department in the Society's Garden.*

Read December 5, 1843.

An article on the Oxalis Deppei, by Professor Morren of Liège, having appeared in "the Gardener's Chronicle," vol. I. p. 68., attention was directed to its cultivation in the Garden of the Society; the mode of culture recommended by Professor Morren being adopted in the first instance. The results of this, and of other modes subsequently tried, leave no doubt respecting the facility with which this real accession to the list of culinary vegetables can be successfully cultivated, so as to furnish an abundant supply. It was necessary that this fact should be well ascertained, because another species of the same genus, Oxalis crenata, has not realized the expectations entertained respecting it.

Oxalis Deppei was first introduced into this country from Mexico in 1827; and was named by Messrs. Loddiges in their *Botanical Cabinet,* No. 1500. Subsequently M. Lejeune gave it the name of Oxalis zonata, "in order to express the black bands of the leaf;" and M. Henon published some information concerning it in the year 1838.*

The uses of this Oxalis in Belgium are enumerated by Professor Morren. He states "that if cut longitudinally the root is found to have a firm transparent rind, the tissue of which resembles that of Salep; like it, it becomes white in drying, is transparent, and consists of cells enclosing a very nutritious substance. The young leaves are dressed like sorrel, in soup or as a vegetable; they have

* Notice sur l'Oxalide de Deppe. 8vo. Lyons, 1838.

a fresh and agreeable acid, especially in spring. The flowers are excellent in salad, alone or mixed with corn salad, endive of both kinds, red cabbage, beet-root, and even with the petals of the Dahlia, which are delicious when thus employed. When served at table, the flowers with their pink corolla, green calyx, yellow stripes and little stamens produce a very pretty effect. The roots, after having been washed and slightly peeled, are gently boiled with salt and water. They are then eaten like asparagus in the Flemish fashion, with melted butter and the yolks of eggs. They are also served up like scorzonera and endive, with white sauce. They form, in whatever way they are dressed, a tender, succulent dish, easy to digest, and agreeing with the most delicate stomach. The analogy of the root with Salep indicates that its effects should be excellent upon all constitutions."

The plant consists of a tapering, white, semi-transparent tap-root of tender substance; furnished, chiefly at and near the lower extremity, with hair-like fibres, a few of which also proceed from the sides. The centre is generally more or less hollow, with the medullary substance adhering in variously fissured portions. The roots in this case are not however in other respects unsound. Sometimes, from rapid absorption, clefts are formed externally; but this will probably be of rare occurrence under favourable circumstances of soil and climate.

On the top of the crown, a mass of scaly bulbs appears; their scales are lined and fringed with orange-brown silky hairs. By means of these buds the plants can be easily and abundantly multiplied. The leaf-stalks are from nine inches to a foot or more in length, supporting four inversely heart-shaped leaflets; each having a dark-coloured band across its centre; these bands are somewhat curved, so that when the four leaflets are arranged in a flat equidistant manner, a tolerably perfect dark circle is formed. The flowers are of a bright rose colour, and are supported on erect scapes above the leaves.

Roots and scaly bulbs of Oxalis Deppei, natural size.

Professor Morren states that Oxalis Deppei "will not thrive in loam, still less in calcareous earth; that it always suffers in heavy land, and often will not produce its tap-roots; but in a sandy soil, light, and mixed with decayed vegetable matter, the plant acquires a large size. The aspect in which it is grown is immaterial, although a southern exposure is to be preferred when not dry." He plants the bulbs on the 15th of April, when he no longer fears frost, an inch deep and five inches apart, in rows which are seven inches asunder. Three or four are put into the same hole, taking care to arrange them in quincunx. The beds are kept clean and in the month of May are watered with liquid cow-dung. As has been already observed, the above mode was adopted in the Society's Garden; but it has been found that the plants do better when the bulbs are planted, singly, six inches apart, in rows a foot asunder.

The soil in the Society's Garden is not naturally well adapted for the growth of some tap-rooted vegetables; the carrot in particular may be instanced as never producing very fine roots in the usual way of cultivation. This being the case, holes are sometimes made and filled with prepared soil for this crop, in order to encourage the tap-roots to extend downwards without subdivision. A similar plan was tried with the Oxalis, and found to answer better than where the whole bed was composed of prepared soil; and the expense was of course comparatively little.*

The bulbs were planted about the middle of April, so shallow as to admit of their being just covered; for thus they occupy a position with regard to the surface similar to that in which they are produced, and this seems indispensable if fine sorts are to be obtained. They have been observed, indeed, to spring up from a considerable depth; but in this case tap-roots were not formed.

During summer the soil must be kept moist in dry weather;

* The plant from which the accompanying figure was made was grown by this method. It would have doubtless been even finer had the summer been more congenial.

otherwise, when rain falls abundantly, the sudden accession of water to the roots occasions their splitting. The plants should be allowed to grow as long as there is no danger from frost; but previously to this occurring, they should either be taken up or protected. If protected from frost, by frames, or otherwise, the roots will continue to increase in size till November. When taken up, the roots should be divested of the numerous bulbs formed on their crowns, and then stored up for use in a cool dry place, but secure from frost. A similar situation will be proper for the bulbs; or they may be kept in dry sand till the season of planting.

Mr. Cockburn, Gardener to the Earl of Mansfield, at Caen Wood, Hampstead, grows this plant in perfection with no particular preparation of soil; merely planting the bulbs in shallow drills, a foot apart, in borders dug and manured as for other kitchen-garden crops. He also plants it by the sides of walks in the woods, as an ornamental plant.

We have in our gardens another Oxalis, apparently the O. Jacquiniana, which also produces tap-roots like those of O. Deppei; but they are much smaller, and inferior in quality. That species is readily known by its flowers being very small and of a pale lilac colour.

III. *Experiments on the Inorganic Constituents of Plants. By* EDWARD SOLLY, *Esq., F. R. S., F. L. S., Hon. Memb. Roy. Agr. Soc. Eng. Experimental Chemist to the Horticultural Society.*

(Communicated by the Chemical Committee.*)

IN pursuing, under the direction of the Chemical Committee, my enquiries into the office performed by the inorganic constituents of Plants, several subjects of investigation naturally presented themselves; amongst which are the following questions. Are the quantity and nature of the inorganic matters which exist in plants certain and invariable, or do they fluctuate and vary according to circumstances? If variable, what are the causes which influence their absorption, and how may it be augmented or diminished? and thirdly, what connexion is there between the formation of any peculiar organic substance and the absorption of particular inorganic matters from the soil? Without pretending to attempt the solution of these questions, I shall proceed to describe briefly some of the experiments, which the consideration of them led to.

In order to trace, if possible, the connexion between the growth of plants and the absorption of particular substances, or their presence in the soil, several experiments were made on different plants, which were manured with various substances and subsequently examined, both mechanically, as to their size or increased developement, and chemically, to ascertain what influence the manure had

* The CHEMICAL COMMITTEE of the Society is supported by voluntary subscriptions among the Fellows of the Society. The following are the present Members of the Committee and the amount of their Subscriptions: His Grace the Duke of Devonshire, 50*l.*; E. Barnard, Esq., 1*l.*; Major Buckley, 1*l.*; Jos. Blunt, Esq., 1*l.* 1*s.*; Thomas Farmer, Esq., 5*l.*; Dr. Henderson, 1*l.*; Sir C. Lemon, Bart., 5*l.*; Dr. Lindley, 5*l.*; Sir O. Mosley, Bart., 5*l.*; W. Murray, Esq., 2*l.*; W. Ogilby Esq., 1*l.*; E. W. Pendarves, Esq., 2*l.*; W. H. Pepys, Esq., 2*l.*; John Rogers, Esq., 5*l.*; R. Horsman Solly, Esq., 5*l.*; Sir J. Sebright, Bart., 5*l.*; Samuel Solly, Esq., 5*l.*; E. Strutt, Esq., 2*l.*; C. Webb, Esq., 3*l.*; J. Wedgwood, Esq., 1*l.*

on the absorption of inorganic, and the formation of organic, matter. The first results obtained were wholly negative, principally from the fact that too small a quantity of the various manures employed, was taken; great inconvenience was also experienced in consequence of the very unequal nature of the soil of the gardens, which led to irregular and unexpected results.

Before describing any experiments, it will be proper to say a few words respecting the nature of the soil on which they were made. The soil of the Horticultural Gardens varies a good deal both in mechanical texture, and in chemical composition. The greater part of it may be termed loamy; but its exact nature of course differs considerably according to the treatment it has received, the mode in which it has been worked, and the nature and quantity of manure which has been applied to it. Generally speaking, it is rich in organic matter, both animal and vegetable, and consequently like all soils of that description, contains a notable quantity of Salts of Ammonia. From its uncertain nature it is far more difficult to define its chemical composition, than is the case with ordinary land; the following are average results, and may be taken as expressing pretty nearly the composition of the soil of the Gardens. A fair sample, freed from stones and well dried, being subjected to mechanical analysis, was found to consist of

Small stones	640
Sand	3470
Finely divided earthy matter	5190
Fibrous organic matter	180
Finely divided and soluble organic matter	520—10000

The sand and small stones were chiefly of a siliceous nature; the chemical composition of the dry soil was

Silica	78730
Alumina	5182
Oxide of Iron	8250
Lime	640
Magnesia	107
Potash and Soda	47
Chlorine	4
Sulphuric Acid	7
Phosphoric Acid	18
Organic matters	7000—100000

In expressing these results, as well as in all the following analyses, I have carefully avoided the use of fractions of any kind; in all the experiments described, the numbers given are

those which would have been obtained, had 10000 or 100000 parts of each substance been analysed. The composition of a substance can be expressed as well by whole numbers, as by decimals; whilst the use of the latter frequently leads to confusion.

The first large experiment was on SAVOYS. A square of young savoys was taken, the plants in which were as nearly as possible uniform in size, and growing under the same circumstances. They were manured with various saline and inorganic substances, applied as top dressings; the quantity used increasing gradually from 100 to 2000 grains to each plant. The substances taken were, Nitrate of Potash, Alum, Nitrate of Soda, Muriate of Ammonia, Sulphur, Sulphate of Iron, Phosphate of Soda, and Sulphate of Magnesia; a number of plants being left without any manure, for the sake of comparison. The effects produced by these various substances, on the appearance of the plants were much less than had been anticipated; very slight differences could be observed and those differences which were apparent, were so irregular and uncertain, that it was hardly possible to say how much could fairly be attributed to the manures, and how much to local circumstances. A number of the plants were, however, examined chemically, but the result of their examination proved as irregular as the effect produced by the manures. The following table exhibits the proportion of water, organic matter, inorganic substances, and azotised matter which they contained.

Young white leaves or heart of Savoy; Composition of 10000 parts.

Manure used.	Water.	Organic matter.	Inorganic matter.	Inorg. matt. in 10000 parts dry.	Albumen in 10000 parts fresh.
Nitrate of Potash .	9152	776	72	849	14
Alum . .	9360	571	69	1093	36
Ditto . .	9563	389	48	1119	13
Nitrate of Soda .	9159	784	57	686	34
Muriate of Ammonia	9352	580	68	1057	26
Sulphur . .	9282	652	66	922	21
Ditto . .	9305	627	68	985	27
Ditto . .	9246	689	65	871	23
Sulphate of Iron .	9307	630	63	913	16
Phosphate of Soda .	9492	446	62	1247	13
Sulphate of Magnesia	9498	446	56	1121	16
No manure .	9260	660	80	1006	24
Ditto . .	9066	860	74	789	44

Green or outer leaves of Savoy; as before.

Manure used.	Water.	Organic matter.	Inorganic matter.	Inorg. matt. in 10000 parts dry.	Albumen in 10000 parts fresh.
Nitrate of Potash .	8666	977	157	1392	48
Alum . .	8902	943	155	1430	51
Ditto . .	8625	1077	298	2174	24
Nitrate of Soda .	8995	868	137	1371	58
Muriate of Ammonia	9272	602	116	1600	31
Sulphur . .	9038	801	161	1674	52
Ditto . .	8679	1214	107	813	31
Ditto .	8926	929	145	1356	24
Sulphate of Iron .	9137	742	121	1408	—
Ditto . .	8915	953	132	1223	35
Phosphate of Soda .	9012	840	148	1502	42
Sulphate of Magnesia	9094	723	183	2027	34
No manure . .	9101	745	154	1619	54
Ditto . .	9038	828	134	1394	64

It is evident that no definite conclusions can be drawn from this series of experiments. All the plants included in the foregoing tables were manured with 1800 or 2000 grains of the substance applied, but as these manures were merely spread on the surface of the soil, and were much protected from rain by the leaves of the young plants, a portion remained on the surface of the soil to the last; this in part accounts for the very trifling effect produced.

At the same time that these experiments were tried, some others were made with plants less able to bear large quantities of saline manures than savoys and most glaucous leaved plants are. A number of plants of common broad leaved Tobacco were manured with Nitrate of Soda, the quantity employed increasing from 3 oz. up to 2 lbs., to each plant. Tobacco was selected for experiment because it is one of those plants which most commonly contain salts of Nitric acid; it was hence reasonable to expect that a top dressing of the Nitrate of Soda would produce a beneficial effect and also that a comparatively large quantity of that salt might be applied without fear of injury. Those plants which had received 4, 8, 12, and 16 oz. respectively of Nitrate of Soda were all rendered more vigorous in their growth and looked greener and far more flourishing than those not so manured; their luxuriance being nearly in proportion to the quantity of the salt they

had received : that to which 16 oz. had been applied being decidedly the best in the row. Beyond one pound no benefit appeared to be produced by increased doses of the Nitrate, and a plant which received 2 lbs. was evidently injured ; it soon began to look unhealthy ; the leaves became yellow and sickly, being covered with yellow and brown spots. The best plant, that which had received 1 lb. of the Nitrate, was then compared with another which had grown under precisely the same circumstances but had received no manure at all ; their relative composition was

	Water.	Organic matter.	Inorganic matter.	Inorganic in 10000 pts. dry.
Common Tobacco leaves	8440	1330	230	1474
Nitrated Tobacco leaves	8320	1420	260	1547

The proportion of azotised matter in the two plants was for each 10000 parts

	Fresh plant.	Dry plant.
Common Tobacco	134	858
Nitrated Tobacco	221	1315

In the examination of these plants a very remarkable fact was observed, which at first was supposed to be an error of observation, until it was confirmed by repetitions, and subsequent experiments. The plants of Tobacco which had received no manure contained a considerable quantity of Nitric acid ; those which had been manured with Nitrate of Soda, however, contained no appreciable quantity.

A corresponding experiment was made with Lettuces, another plant commonly found to contain Nitrates ; but the results obtained in this case were less marked, because the plants had all been previously manured with rotten dung in the usual manner. Some of the plants were manured with the Nitrate, and others with the Carbonate of Soda ; the latter were very nearly as healthy in appearance, as those which had merely received dung ; in fact there was very little visible effect produced by either salt. On examination they were found to contain

	Water.	Organic matter.	Inorganic matter.	Inorganic in 10000 pts. dry.
Rotten Dung alone	9350	562	88	1357
Ditto and Nitrate of Soda	9387	535	78	1288
Ditto and Carbonate of Soda	9375	544	81	1292

Carbonate of Soda was employed, in order to compare the effect

produced by the Nitrate of Soda on the formation of azotised matter with that produced by the use of another salt of the same alkali, not containing nitrogen. The following was the result.

	Albumen fresh plant.	Albumen dry plant.
Rotten Dung	43	661
Ditto and Nitrate of Soda	46	750
Ditto and Carbonate of Soda	44	704

In the experiment with Tobacco just described, a considerable effect was produced by the Nitrate of Soda; a given quantity of leaves contained less water, and more organic and inorganic matter, than those which had not been manured with the nitrate; and it is evident that the nitrated plant had absorbed a larger quantity of inorganic matter, in proportion to its weight, than the other had, because on comparison it appears that the dry leaves of the former contained about a twentieth part more inorganic matter than the latter. In the case of the lettuces a very different effect was produced. In this, the plants manured with Carbonate and Nitrate of Soda, grew more rapidly than those manured with Rotten Dung alone; hence, they contained a larger proportion of water, and a smaller quantity of inorganic matter. This more vigorous growth was apparently not connected with any increased absorption of inorganic substances, because in both cases where the saline manure was applied, the dry plant contained nearly a twentieth less inorganic matter than that only manured with Dung.

A fourth experiment was made on a far more extended scale, with Potatoes. A number of tubers of the Bread-fruit potato were planted, each in the centre of a square yard of ground, and manured with various saline and other manures. The tubers taken, were as nearly as possible alike; they were planted on the 28th of April, the various manures being applied at the time the tubers were set. The stems or haulm were gathered, and the tubers taken up in October. The tubers were planted eight inches below the surface of the ground, each being placed in the centre of a square yard, the surface soil of which was removed to the depth of two inches; the manures were then spread, and the two inches of

soil replaced; the plants were subsequently earthed up in the ordinary manner. The nature of the manures applied, the quantity of produce obtained from each plant, and the composition of the tubers, &c. are as follows:—

No. 1. Not manured at all, the produce was, large tubers 7 lbs. 3 oz., small tubers 13 oz., total 8 lbs. The dry straw or haulm weighed 3270 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7713	2173	114
Dry Tubers	——	9499	501
Dry Haulm	——	8872	1128

Tubers.

Starch	1071
Starchy fibre	652
Albumen	87
Mucilage, Resin, Fatty matter, &c.	504
Water	7713—10000

No. 2. Manured with Rotten Dung at the rate of five tons per acre. The produce was, large tubers 11 lbs. 2 oz., small tubers 6 oz., total 11 lbs. 8 oz. The dry haulm weighed 2158 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7708	2170	122
Dry Tubers	——	9368	532
Dry Haulm	——	8981	1019

Tubers.

Starch	1071
Starchy fibre	572
Albumen	102
Mucilage, Resin, Fatty matter, &c.	547
Water	7708—10000

No. 3. Manured with Gypsum, at the rate of 2 cwt. 96 lbs. per acre. The produce was, large tubers 8 lbs., small tubers 4 oz., total 8 lbs. 4 oz. The dry haulm weighed 1013 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7722	2159	119
Dry Tubers	——	9458	542
Dry Haulm	——	8609	1391

Tubers.

Starch	1079
Starchy fibre	543
Albumen	112
Mucilage, Resin, Fatty matter, &c.	544
Water	7722—10000

No 4. Manured with Nitrate of Soda at the rate of 1 cwt. 48 lbs. per acre. The produce was, large tubers 8 lbs. 11 oz., small tubers 5 oz., total 9 lbs. The dry haulm weighed 1869 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7732	2158	110
Dry Tubers	——	9512	488
Dry Haulm	——	8759	1241

Tubers.

Starch	1212
Starch fibre	613
Albumen	115
Mucilage, Resin, Fatty matter, &c.	328
Water	7723—10000

No. 5. Manured with Salt Cake (Sulphate of Soda) at the rate

of 1 cwt. 48 lbs. per acre. The produce was, large tubers 13 lbs. 14 oz., small tubers 1 lb. 2 oz., total 15 lbs. The dry haulm weighed 3301 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7734	2154	112
Dry Tubers	——	9505	495
Dry Haulm	——	8970	1030

Tubers.	
Starch . . .	1215
Starchy fibre . . .	557
Albumen . . .	97
Mucilage, Resin, Fatty matter, &c. .	397
Water	7734—10000

No. 6. Manured with Epsom Salts (Sulphate of Magnesia) at the rate of 1 cwt. 48 lbs. per acre. The produce was, large tubers 9 lbs. 15 oz., small tubers 8 oz., total 10 lbs. 7 oz. The dry haulm weighed 2099 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7877	2001	122
Dry Tubers	——	9425	575
Dry Haulm	——	8924	1076

Tubers.	
Starch	1292
Starchy fibre . .	589
Albumen . . .	104
Mucilage, Resin, Fatty matter, &c. .	129
Water	7877—10000

No. 7. Manured with Nitrate of Soda at the rate of 2 cwt 96 lbs. per acre. The produce was, large tubers 6 lbs. 12 oz., small tubers 13 oz., total 7 lbs. 9 oz. The dry haulm weighed 1652 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7720	2149	131
Dry Tubers	——	9425	575
Dry Haulm	——	8935	1065

Tubers.	
Starch	1232
Starchy fibre . .	591
Albumen . . .	119
Mucilage, Resin, Fatty matter, &c. .	338
Water . . .	7720—10000

No. 8. Manured with Salt Cake at the rate of 2 cwt. 96 lbs. per acre. The produce was, large tubers 17 lbs. 1 oz., small tubers none, total 17 lbs. 1 oz. The dry haulm weighed 2196 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7770	2123	107
Dry Tubers	——	9519	481
Dry Haulm	——	8835	1165

Tubers.	
Starch . . .	1330
Starchy fibre . .	495
Albumen	84
Mucilage, Resin, Fatty matter, &c. .	321
Water	7770—10000

No. 9. Manured with Epsom Salts at the rate of 2 cwt. 96 lbs. per acre. The produce was, large tubers 9 lbs. 5 oz., small tubers 7 oz., total 9 lbs. 12 oz. The dry haulm weighed 2006 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7691	2191	118
Dry Tubers	——	9485	515
Dry Haulm	——	8894	1106

Tubers.	
Starch	1218
Starchy fibre	652
Albumen	109
Mucilage, Resin, Fatty matter, &c.	330
Water	7691—10000

No. 10. Manured with Sal Ammoniac (Muriate of Ammonia) at the rate of 1 cwt. 48 lbs. per acre. The produce was, large tubers 10 lbs. 13 oz., small tubers 8 oz., total 11 lbs. 5 oz. The dry haulm weighed 2619 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7970	1915	115
Dry Tubers	——	9430	570
Dry Haulm	——	8970	1030

Tubers.	
Starch	1171
Starchy fibre	642
Albumen	100
Mucilage, Resin, Fatty matter, &c.	117
Water	7970—10000

No. 11. Manured with Green Vitriol (Sulphate of Iron) at the rate of 1 cwt. 48 lbs. per acre. The produce was, large tubers 7 lbs., small 13 oz., total 7 lbs. 13 oz. The dry haulm weighed 1367 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7862	2025	113
Dry Tubers	——	9468	532
Dry Haulm	——	8881	1119

Tubers.	
Starch	1076
Starchy fibre	684
Albumen	111
Mucilage, Resin, Fatty matter, &c.	267
Water	7862—10000

No. 12. Manured with a mixture of Nitrate of Soda and Salt Cake, containing equal parts of both, at the rate of 1 cwt. 48 lbs. The produce was, large tubers 9 lbs. 7 oz., small tubers 6 oz., total 9 lbs. 13 oz. The dry haulm weighed 2073 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7745	2138	117
Dry Tubers	——	9480	520
Dry Haulm	——	8957	1043

Tubers.	
Starch	1125
Starchy fibre	591
Albumen	90
Mucilage, Resin, Fatty matter, &c.	749
Water	7445—10000

No. 13. Manured with Nitrate of Soda and Salt Cake, mixed in equal quantities, at the rate of 2 cwt. 96 lbs. per acre. The produce was, large tubers 8 lbs. 14 oz., small tubers 5 oz., total 9 lbs. 3 oz. The dry haulm weighed 1675 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic Matter.	Inorganic matter.
Fresh Tubers	7856	2023	121
Dry Tubers	——	9435	565
Dry Haulm	——	8992	1008

Tubers.

Starch	1067
Starchy fibre	663
Albumen	110
Mucilage, Resin, Fatty matter, &c.	304
Water	7856—10000

No. 14. Manured with putrid Urine at the rate of 800 gallons per acre. The produce was, large tubers 5 lbs. 6 oz., small tubers 3 oz., total 5 lbs. 9 oz. The dry haulm weighed 1324 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7842	2044	114
Dry Tubers	——	9470	530
Dry Haulm	——	8943	1057

Tubers.

Starch	1193
Starchy fibre	655
Albumen	107
Mucilage, Resin, Fatty matter, &c.	203
Water	7842—10000

No. 15. Manured with putrid Urine, fixed with Sulphate of Iron, at the rate of 800 gallons per acre. The produce was, large tubers 8 lbs. 3 oz., small tubers 2 lbs. 2 oz., total 10 lbs. 5 oz. The dry haulm weighed 1995 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7630.	2263	107
Dry Tubers	——	9545	455
Dry Haulm	——	9026	974

Tubers.

Starch	1302
Starchy fibre	572
Albumen	85
Mucilage, Resin, Fatty matter, &c.	411
Water	7630—10000

No. 16. Manured with Daniell's Bristol Manure (the old sort) at the rate of 20 bushels per acre. The produce was, large tubers 9 lbs. 15 oz., small tubers 1 lb., total 10 lbs. 15 oz. The dry haulm weighed 2619 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7755	2151	94
Dry Tubers	——	9580	420
Dry Haulm	——	8912	1088

Tubers.

Starch	1155
Starchy fibre	689
Albumen	97
Mucilage, Resin, Fatty matter, &c.	304
Water	7755—10000

No. 17. Manured with Daniell's Bristol Manure (new sort) at the rate of 20 bushels per acre. The produce was, large tubers 11 lbs. 2 oz., small tubers 7 oz., total 11 lbs. 9 oz. The dry haulm weighed 2515 grains. The tubers and haulm contained

Tubers and Haulm.

	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7725	2161	114
Dry Tubers	——	9495	505
Dry Haulm	——	9030	970

Tubers.

Starch	1156
Starchy fibre	629
Albumen	107
Mucilage, Resin, Fatty matter, &c.	383
Water	7725—10000

No. 18. Manured with Guano at the rate of 16 cwt. 27 lbs. per acre. The produce was, large tubers 9 lbs. 6 oz., small tubers 13 oz., total 10 lbs. 3 oz. The dry haulm weighed 1802 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7878	2008	114
Dry Tubers	——	9458	542
Dry Haulm	——	8933	1067

Tubers.	
Starch	1175
Starchy fibre	692
Albumen	95
Mucilage, Resin, Fatty matter, &c.	160
Water	7878—10000

No. 19. Manured with Bone Dust at the rate of 76 bushels per acre. The produce was, large tubers 10 lbs. 5 oz., small tubers 1 lb. 5 oz., total 11 lbs. 10 oz. The dry haulm weighed 2084 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7661	2225	114
Dry Tubers	——	9510	490
Dry Haulm	——	8887	1113

Tubers.	
Starch	1093
Starchy fibre	680
Albumen	92
Mucilage, Resin, Fatty matter, &c.	474
Water	7661—10000

No. 20. Manured with Nightsoil at the rate of 5 tons per acre. The produce was, large tubers 10 lbs. 14 oz., small tubers 5 oz., total, 11 lbs. 3 oz. The dry haulm weighed 2456 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7795	2089	116
Dry Tubers	——	9470	530
Dry Haulm	——	8950	1050

Tubers.	
Starch	1240
Starchy fibre	598
Albumen	99
Mucilage, Resin, Fatty matter, &c.	268
Water	7795—10000

No. 21. Manured with Nightsoil disinfected with Bleaching-powder (Chloride of Lime) at the rate of 5 tons per acre. The produce was, large tubers 7 lbs. 3 oz., small tubers 2 oz., total, 7 lbs. 5 oz. The dry haulm weighed 1152 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7834	2045	121
Dry Tubers	——	9438	562
Dry Haulm	——	8542	1458

Tubers.	
Starch	1305
Starchy fibre	652
Albumen	112
Mucilage, Resin, Fatty matter, &c.	97
Water	7834—10000

No. 22. Manured with Nightsoil disinfected with Bleaching-powder and Sulphuric Acid at the rate of 5 tons per acre. The produce was, large tubers 9 lbs. 5 oz., small 15 oz., total, 10 lbs.

4 oz. The dry haulm weighed 1968 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7652	2232	116
Dry Tubers	——	9503	497
Dry Haulm	——	8984	1016

Tubers.	
Starch . . .	1291
Starchy fibre . .	581
Albumen	100
Mucilage, Resin, Fatty matter, &c. .	376
Water	7652—10000

No. 23. Manured with Nightsoil disinfected with Bleaching-powder and Sulphate of Iron at the rate of 5 tons per acre. The produce was, large tubers 7 lbs. 2 oz., small tubers 13 oz., total, 7 lbs. 15 oz. The dry haulm weighed 1412 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh tubers	7717	2166	117
Dry Tubers	——	9485	515
Dry Haulm	——	8874	1126

Tubers.	
Starch	1046
Starchy fibre . . .	607
Albumen . . .	93
Mucilage, Resin, Fatty matter, &c. .	537
Water . . .	7717—10000

No. 24. Manured with Nightsoil disinfected with Sulphuric Acid, at the rate of 5 tons per acre. The produce was, large tubers 9 lbs. 14 oz., small tubers none, total 9 lbs. 14 oz. The dry haulm weighed 2029 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7630	2252	118
Dry Tubers	——	9500	500
Dry Haulm	——	9020	980

Tubers.	
Starch . . .	1187
Starch fibre . . .	628
Albumen	97
Mucilage, Resin, Fatty matter, &c. .	458
Water	7630—10000

No. 25. Manured with Sulphur at the rate of 2 cwt. 78 lbs. per acre. The produce was, large tubers 9 lbs. 1 oz., small tubers, none, total 9 lbs. 1 oz. The dry haulm weighed 2510 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7795	2116	99
Dry Tubers	——	9550	450
Dry Haulm	——	8797	1203

Tubers.	
Starch . . .	1067
Starchy fibre . . .	619
Albumen . . .	95
Mucilage, Resin, Fatty matter, &c. .	424
Water	7795—10000

No. 26. Manured with the Refuse Ammoniacal Water of the Gas Works, at the rate of 800 gallons per acre. The produce was, large tubers 5 lbs. 6 oz., small tubers 12 oz., total 6 lbs. 2 oz.

The dry haulm weighed 1377 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7745	2133	122
Dry Tubers	——	9455	545
Dry Haulm	——	8854	1146

Tubers.	
Starch	1130
Starchy fibre	620
Albumen	117
Mucilage, Resin, Fatty matter, &c. .	388
Water	7745—10000

No. 27. Manured with Gas Water fixed with Sulphuric Acid, at the rate of 800 gallons per acre. The produce was, large tubers 8 lbs. 12 oz., small tubers 11 oz., total, 9 lbs. 7 oz. The dry haulm weighed 2029 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7860	2029	111
Dry Tubers	——	9480	520
Dry Haulm	——	8842	1158

Tubers.	
Starch	1150
Starchy fibre	596
Albumen	97
Mucilage, Resin, Fatty matter, &c. .	297
Water	7860—10000

No. 28. Manured with Gas Water fixed with Phosphoric Acid, at the rate of 800 gallons per acre. The produce was, large tubers 4 lbs. 13 oz., small tubers 8 oz., total, 5 lbs. 5 oz. The dry haulm weighed 965 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7858	2031	111
Dry Tubers	——	9480	520
Dry Haulm	——	8664	1336

Tubers.	
Starch	1172
Starchy fibre	617
Albumen	127
Mucilage, Resin, Fatty matter, &c. .	226
Water	7858—10000

No. 29. Manured with Gas Water fixed with Muriatic Acid, at the rate of 800 gallons per acre. The produce was, large tubers 8 lbs. 5 oz., small tubers 2 oz., total 8 lbs. 7 oz. The dry haulm weighed 1636 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7793	2093	114
Dry Tubers	——	9480	520
Dry Haulm	——	8943	1057

Tubers.	
Starch	1107
Starchy fibre	620
Albumen	103
Mucilage, Resin, Fatty matter, &c. .	377
Water	7793—10000

No. 30. Manured with Ammoniacal Gas Water fixed with Nitric Acid, at the rate of 800 gallons per acre. The produce was, large tubers 5 lbs. 6 oz., small tubers 12 oz., total 6 lbs. 2 oz. The dry haulm weighed 1332 grains. The tubers and haulm contained

Tubers and Haulm.	Water.	Organic matter.	Inorganic matter.
Fresh Tubers	7725	2154	121
Dry Tubers	——	9465	535
Dry Haulm	——	8799	1201

Tubers.	
Starch	1152
Starchy fibre . . .	685
Albumen . . .	105
Mucilage, Resin, Fatty matter, &c. .	333
Water	7725—10000

On comparing together the result of this series of Experiments, it is evident that there are several discrepancies, which are probably occasioned by local peculiarities in the plants which formed the subject of experiment; and that the trial was conducted on too small a scale. The analyses have therefore not been carried out to that degree of nicety which had been originally intended, as it was determined to repeat the experiment on a larger scale, and with a smaller number of simple saline manures. Several points, however, of considerable interest, are learnt, even by this experiment, as to the relation which exists between the weight of the stems, the proportion of earthy matter which they contain, the weight of the tubers, and the proportions of their azotised and inorganic constituents. In the following Table some of these results are exhibited, plants being arranged in the order of the weight of the stems.

Manure applied.	Weight of Haulm in Grains.	Inorganic matter in 10000 pts., Haulm.	Weight of Tubers, Ounces.	Inorganic matter in 10000 pts., Tubers.	Albumen in 10000 pts., Tubers.
28. Gas liquor and Phosphoric acid . . .	965	1336	85	520	127
3. Gypsum	1013	1391	132	542	112
21. Nightsoil and Bleaching powder . .	1152	1458	117	562	112
14. Putrid urine	1324	1057	89	530	107
30. Gas liquor and Nitric acid	1332	1201	98	535	105
11. Sulphate of iron	1367	1119	125	532	111
26. Gas liquor	1377	1146	98	545	117
23. Nightsoil with Bleaching powder and Sulphate of iron	1412	1126	127	515	93
29. Gas liquor and Muriatic acid . . .	1636	1057	135	520	103
7. Nitrate of Soda (2.96)*	1652	1065	121	575	119
13. Nitrate of soda and Salt cake (2.96) . .	1675	1008	147	565	110
18. Guano	1802	1067	163	542	95
4. Nitrate of Soda (1.48)	1869	1241	144	488	115
24. Nightsoil and Sulphuric acid	1968	1016	164	497	100
15. Putrid urine and Sulphate of iron . . .	1995	974	165	455	85
9. Epsom salts (2.96	2006	1106	156	515	109
27. Gas liquor and Sulphuric acid . . .	2029	1158	151	520	97
22. Nightsoil with Bleaching powder and Sulphuric acid	2029	980	158	500	97
12. Nitrate of soda and salt cake (1.48) . .	2073	1043	157	520	90
19. Bone dust	2084	1113	186	490	92
6. Epsom salts (1.48)	2099	1076	167	575	104
2. Rotten dung	2158	1019	184	532	102
5. Salt cake (1.48)	2196	1165	273	481	84
20. Nightsoil	2456	1050	179	530	99
25. Sulphur	2510	1203	145	450	95
17. Daniell's manure (new sort)	2515	970	185	505	107
10. Sal-ammoniac	2619	1030	181	570	100
16. Daniell's manure (old sort) . . .	2619	1088	175	420	97
1. No manure	3270	1128	128	501	87
8. Salt cake (2.96)	3301	1030	240	495	97

* These numbers indicate the quantity of the manure used, either 1 cwt. and 48 lbs., or double that quantity, viz. 2 cwt. and 96 lbs. per acre.

It must be borne in mind that these experiments were made on garden ground, the composition and nature of which is very variable and uncertain, and far too rich to enable positive deductions to be formed of the relative value of the different substances employed as manure. The general inference furnished by the above table is, that those plants having the largest and most vigorous tops, produced the largest quantity of tubers; but that the tubers of these plants were the poorest in azotised matters. It is also worthy of remark, that those tubers which are richest in azotised matters, are also those which contain the greatest relative proportion of inorganic matter. Thus selecting from the foregoing table the three tubers richest, and the three poorest in azotised matter, we have

Richest.			Poorest.		
Albumen.	Inorganic matter.	Weight of Haulm.	Albumen.	Inorganic matter.	Weight of Haulm.
127	520	965	84	481	2196
119	575	1652	85	455	1995
117	545	1377	87	501	3270
Mean. 121	546	1331	85	478	2487

The earthy ingredients of the haulm and tubers, were for the reason above adverted to, not examined in detail; but a general analysis of the whole series was made, the results of which sufficiently show, that the nature of the earthy ingredients both of the haulm and of the tubers, but more particularly of the former, varied very greatly. The following tables exhibit the proximate composition of these inorganic matters, divided into Alkaline salts, earthy salts, and siliceous matter: the first head including Carbonate, Phosphate, Sulphate, and Muriate of Potash and Soda; the second, soluble as well as insoluble Salts of Lime and Magnesia, together with Oxides of Iron and Manganese. Both tables are arranged in the order of the quantity of Alkaline matter which the substances contained.

Inorganic Constituents of Experimental Potato Haulm.

	Alkaline.	Earthy.	Siliceous.
1. No manure	4667	4079	1253
29. Gas liquor and Muriatic acid	3697	4703	1597
5. Salt Cake (1.48)	3371	5233	1394
2. Rotten Dung	3221	5510	1269
16. Daniell's manure (old sort)	3124	5113	1763
10. Sal ammoniac	3061	5602	1337
6. Epsom salts (1.48)	2900	5400	1700
9. Epsom salts (2.96)	2789	5915	1306
17. Daniell's manure (new sort)	2473	6087	1438
12. Nitrate of Soda and Salt cake (1.48)	2320	5836	1844
8. Salt cake (2.96)	2263	5517	2220
20. Night soil	2243	6142	1615
19. Bone dust	2223	5573	2181
18. Guano	2203	6207	1590
11. Sulphate of Iron	2121	6027	1851
7. Nitrate of Soda (2.96)	2098	5865	2037
13. Nitrate of Soda and Salt cake (2.96)	1953	6316	1731
4. Nitrate of Soda (1.48)	1886	6143	1971
24. Night soil and Sulphuric acid	1712	6652	1636
3. Gypsum	1694	5609	2695
27. Gas liquor and Sulphuric acid	1419	6699	1882
22. Night soil with bleaching powder and Sulphuric acid	1327	6852	1821
25. Sulphur	1138	5785	3177
14. Putrid urine	1064	5100	3836
21. Night soil and bleaching powder	964	4957	4078
23. Night soil with bleaching powder and Sulphate of iron	954	6628	2418
30. Gas liquor and Nitric acid	814	5212	3974
15. Putrid urine and Sulphate of iron	568	7255	2177
26. Gas liquor	521	7008	2471
28. Gas liquor and Phosphoric acid	315	7121	2564

Inorganic Constituents of Experimental Potato Tubers.

	Alkaline.	Earthy.	Siliceous.
24. Night soil and Sulphuric acid	8927	997	76
19. Bone dust	8915	1041	44
3. Gypsum	8874	1068	58
18. Guano	8866	1076	58
25. Sulphur	8865	1028	107
4. Nitrate of Soda (1.48)	8840	1094	66
20. Night soil	8790	1191	19
5. Salt cake (1.48)	8753	1167	80
13. Nitrate of Soda and Salt cake (2.98)	8739	1168	92
8. Salt cake (2.96)	8733	1172	95
22. Night soil with bleaching powder and Sulphuric acid	8722	1237	41
23. Night soil with bleaching powder and Sulphate of iron	8711	1202	87
12. Nitrate of Soda and Salt cake (1.48)	8686	1239	75
9. Epsom salts (2.96)	8670	1242	88
28. Gas liquor and Phosphoric acid	8668	1292	40
7. Nitrate of Soda (2.96)	8666	1245	87
27. Gas liquor and Sulphuric acid	8651	1268	81
30. Gas liquor and Nitric acid	8592	1336	72
1. No manure	8575	1354	71
10. Sal ammoniac	8557	1227	216
26. Gas liquor	8484	1448	68
2. Rotten dung	8475	1408	117
21. Night soil and bleaching powder	8341	1625	34
11. Sulphate of Iron	8326	1595	79
14. Putrid urine	8309	1640	51
6. Epsom salts (1.48)	8219	1682	99
16. Daniell's manure (old sort)	8211	1691	98
17. Daniell's manure (new sort)	8063	1803	134
29. Gas liquor and Muriatic Acid	8037	1907	56
15. Putrid urine and Sulphate of Iron	7293	2559	148

It is almost impossible to draw certain conclusions from these results, in consequence of the small scale on which the experiment was made, it is however worthy of remark that generally speaking, those stems which contained the greatest quantity of inorganic matter, contained relatively a larger proportion of alkaline salts, than those stems in which a less quantity of inorganic matter was found.

Particular attention was paid, during the examination of these plants, to the existence of Nitric Acid in them; none of the tubers were found to contain any; some of the stems did, whilst the greater number did not contain any Nitric Acid, the following table shews these differences :—

Stems which contained Nitric Acid.			Stems which contained no Nitric Acid.		
1.	Manured with	nothing.	3.	Manured with	Gypsum.
2.	do.	Rotten Dung.	8.	do.	Salt Cake. (2. 96.)
4.	do.	Nitrate of Soda. (1. 48.)	9.	do.	Epsom Salts. (2. 96.)
5.	do.	Salt Cake. (1. 48.)	11.	do.	Sulphate of Iron.
6.	do.	Epsom Salts. (1. 48.)	13.	do.	Nitrate of Soda and Salt Cake. (2. 96.)
7.	do.	Nitrate of Soda. (2. 96.)	15.	do.	Putrid Urine and Sulphate of Iron.
10.	do.	Sal Ammoniac.	16.	do.	Daniell's Manure (old sort).
12.	do.	Nitrate of Soda and Salt Cake. (1. 48.)	17.	do.	Daniell's Manure (new sort).
14.	do.	Putrid Urine.	18.	do.	Guano.
27.	do.	Gas Liquor and Sulphuric Acid.	19.	do.	Bone Dust.
29.	do.	Gas Liquor and Muriatic Acid.	20.	do.	Night Soil.
30.	do.	Gas Liquor and Nitric Acid.	21.	do.	Night Soil and Bleaching Powder.
			22.	do.	Night Soil with Bleaching Powder and Sulphuric Acid.
			23.	do.	Night Soil with Bleaching Powder and Sulphate of Iron.
			24.	do.	Night Soil with Sulphuric Acid.
			25.	do.	Sulphur.
			26.	do.	Gas Liquor.
			28.	do.	Gas Liquor and Phosphoric Acid.

The fact that some of these plants contained salts of Nitric Acid, whilst others did not, is very remarkable, and of especial interest in connexion with the action of the Nitrates as manure. Professor Liebig says, in his "Chemistry in its applications to Agriculture," etc. (3rd edit. p. 233.) "The presence of a Nitrate in plants permits only one conclusion — that the nitrogen of Nitric Acid is not employed in their organism for the formation of compounds containing that element, because, if it were, at a certain period of the life of the plant, it would disappear on account of this conversion." The existence of Nitrates in a plant cannot, as it appears to me, be

considered as any evidence that the Nitrate does not supply Nitrogen to the plant. It might in the same way be argued, that Ammonia does not supply nitrogen to plants, because it is very constantly found in them. With regard to the disappearance of the Nitric Acid at a certain period of the life of the plant, it is desirable to have experimental evidence; I have found in several cases that the proportion of Nitric Acid in plants was great when they were young and gradually diminished as they grew older. I have already adverted to the curious fact that when plants were manured with Nitrates they grew very vigorously, but were not found on examination to contain any Nitric Acid; in the experiments on potatoes just described, it appears, that those manured with Salt Cake and Nitrate of Soda (No. 13), contained no Nitric acid, whilst those manured with Salt Cake alone (No. 5), did contain Nitrates. In the course of an extensive series of experiments on plants, presently to be described, Nitric acid was found in the following:—

Potato — tubers, stems, leaves.
Yellow Stem Beet — leaves, stems and roots.
Bassano Beet — root.
Whyte's Dark Red Beet — root.
Chappel's Brocoli — stems.
Victoria Brocoli — stems.
Spinach, Flanders, Lettuce-leaved and Summer— leaves and stalks.
Fennel — leaves.
Mustard — whole plants.
Shallots — bulbs.
Tobacco — whole plants.
Rhubarb, Rheum crispum — bud scales.
Chervil, Scandix odorata — leaf-stalks.
Turnips — roots and leaves.
Radishes — roots and leaves.
Cucumber — fruit.
Clary, Salvia Sclarea — stalks.
Green Sage — leaves.
Chenopodium Bonus Henricus or English Mercury — stalks.
Chaumontel Pear — young and small unripe fruit.
Marjoram — whole plant.
Spear Mint — leaves and stalks.
Borage — leaves and stalks.
Lettuce — whole plant.
Carrots — whole plants.
Solomon's Seal — roots.
Mangel Wurzel — roots, leaves and leaf-stalks.
Savory, Summer — whole plants.
Scarlet Runners — unripe pods.
Brussels Sprouts — whole plants.
Tomato — leaves and stems.

As considerable facilities are afforded for experiments on the absorption of earthy matters, by Parasitical plants and Epiphytes several experiments were made with these curious plants. Setting out with the known fact, that all plants contain certain inorganic matters, it became interesting to enquire whence those plants which grow on or derive their nourishment from other plants, obtain their earthy matters. It follows, that if parasites derive the earthy matters necessary to their growth, from the plants on which

they feed, that the growth of the former, must, to some extent, be dependent on the quantity of inorganic matter contained by the latter. This conclusion, if born out by experiment, would lead to a subject of considerable practical interest, namely, the influence which the earthy matters in wood may have on the growth of fungi, and decay of timber.

The Mistletoe (Viscum album) derives a large proportion of earthy matters from the trees on which it grows. On examining a plant, I found in the leaves 820, in the branches 462, and on the stem 282 parts of inorganic matter; whilst the apple tree on which it grew contained only 233 parts, in 10000 parts of the dry plants. On examining other parasitic plants and fungi, it was found that in all cases they contained a large proportion of earthy matters, and very commonly far more than the plants on which they grew. Whether the whole of these inorganic substances was derived from the trees on which they grew is questionable, it is by no means impossible that some of it may have been derived from the air. Several fungi contain it is well known a notable quantity of copper, I have in particular found it in the large brown Boletus which grows upon Elm Trees, but I was unable to detect any in the wood or bark of the tree on which it grew.

The inorganic constituents of EPIPHYTES were next examined. As many of these curious plants, which grow on the stems and branches of trees, derive nourishment chiefly from the air, and seem to flourish equally well, whether their roots enter the soil, or hang freely in the air; it was interesting to ascertain what proportion of earthy matters they contained, and whether it varied under different circumstances. It appeared probable that the quantity of inorganic matter which they contained would be smaller, than that in most plants, and that the quantity present in those which grew only in air would be less than in those whose roots entered the soil. It was found however that the leaves of Orchidaceous plants contain

about as much inorganic matter as those of cabbages and other similar plants and that there was but a trifling difference evident, whether the plants had their roots in the soil, or in the air. The proportion of earthy matter in a plant of Catasetum grown in soil and a plant of Bletia, grown wholly suspended in the air, were

	Water.	Organic matter.	Inorganic matter.	Inorganic in 10000 parts dry.
Catasetum bulbs	8669	1269	62	465
Bletia bulbs	8309	1609	82	488
Catasetum leaves	8055	1791	154	794
Bletia leaves	8200	1658	142	793

Though the whole quantity of earthy matter present in the plant, as shewn by the proportion contained in the dry leaves and bulbs was nearly similar, very considerable difference was found in the nature of these substances ; a proximate analysis gave

	Catasetum bulbs.	Bletia bulbs.
Alkaline Salts	3752	3792
Earthy Phosphates	183	222
Carbonate of Lime	4281	2850
Carbonate of Magnesia	1315	579
Siliceous matter	428	2596
	10000	10000

The examination of good and bad Timber, with a view to trace out any connection between its qualities and the inorganic substances it contains, is a subject requiring many experiments, and necessarily occupying a very long time. The following experiments, however, are complete in themselves, and possess considerable interest in connection with the present subject. In following out the general scheme of inquiry, a large collection of samples of wood from different localities, grown in various situations, and under various conditions has been made ; amongst these, was a series of specimens of oak wood, for which I am indebted to Sir William Symonds, and which, in addition to their being from different parts of the world, were all of known quality, each sample being marked with a note of its quality deduced from actual experience. It is to be regretted that the majority of them were bad or inferior, even those from localities whence the very best wood is usually imported, hence, of course, they cannot be regarded as

average samples but rather as exceptions. The proportion of earthy matter which they contained, together with their locality, and relative goodness, is contained in the following Table.

Oak Wood from	Quality.	Organic matter.	Water.	Inorganic matter.	Inorganic in 10000 parts dry.
America (white) .	bad . .	9188	773	39	42
Ditto (live oak) .	good . .	9306	621	73	78
Ditto ditto " Gibraltar"	good . .	8615	1111	274	308
Crimea . .	tolerable .	8909	1026	65	73
Canada . .	bad . .	8845	1132	23	27
Circassian .	indifferent .	9125	841	34	37
Danzig . .	tolerable for plank	8939	1037	24	27
England (mean of 10.)	various . .	8888	1097	15	18
East Prussia .	indifferent .	9143	832	25	28
French . .	bad . .	8892	1092	16	19
Farnia (Tuscany) .	bad .	9234	722	44	52
Hainault . .	bad . .	8728	1258	14	16
Istria . .	bad . .	9011	923	66	73
Poland . .	indifferent . .	9059	924	17	18
Podolia . .	bad . .	8950	1019	31	35
Russia . .	bad . .	9013	977	10	11
Styria . .	indifferent and light	8985	997	18	20
Sardinia . .	good . .	8969	1003	28	32
Tuscany . .	good . .	8899	917	184	202
Ischia . .	good for plank .	9025	957	18	20

The larger proportion of earthy matters in the oak of southern countries is remarkable, as contrasted with the smaller quantity found in English oak, and the oak of northern countries generally. Still from this table no general conclusion can be drawn as to the relation between the inorganic substances and the quality of the wood.

To the kindness of Sir W. Symonds, I am also indebted for samples of English oak and Danzig fir in the first stages of dry rot. In both of these, the proportion of inorganic matter is very large; the result of the examination of these samples, together with that of two good samples of sound Memel and Danzig fir, is given in the following Table.

	Organic matter.	Water.	Inorganic matter.	Inorganic in 10000 parts dry.
Oak Timber beginning to decay	6738	3230	32	47
Oak Plank ditto ditto	7273	2682	35	49
Fir Timber ditto ditto	6046	3756	198	318
Fir Timber, Memel, sound	8778	1201	21	24
Fir Timber, Danzig, sound	9084	899	17	19

Generally speaking the young parts of plants contain far more INORGANIC MATTER than the older parts; after a certain time, and particularly when woody fibre is formed, the organic part of the

plant continues to increase far more rapidly than the inorganic matters do: hence the real proportion of the latter appears to decrease. In the experiment however, on Savoys, first described, it would seem that the young leaves contained in reality less earthy matter, than the older leaves; and that in them the proportion of inorganic to organic matter, was smaller than in the older leaves. On comparison it was found that a very marked difference existed in the composition of these inorganic matters; a proximate analysis gave

	Young leaves.	Old leaves.
Alkaline salts	5191	3497
Earthy Phosphates and Oxide of Iron .	3446	1986
Carbonate of Lime	712	2665
Carbonate of Magnesia	151	815
Siliceous matter	500 in 10000.	1037 in 10000.

The young leaves of the Savoy are so completely protected from air and light that they can hardly be well compared with the young leaves of ordinary plants, which as soon as they emerge from the bud are to a greater or less degree exposed to the light. In order to ascertain what influence LIGHT has on the absorption of inorganic matters, a number of hyacinths were grown, some in light and some in darkness; the following were the results. The bulbs selected were as nearly as possible similar in size and weight; half were planted in dark and half in light, some in water only, others in rich artificial soil, and the rest in sand. Four of the roots being dried thoroughly and burnt, their composition was found to be very nearly uniform; they consisted of 6435 water, 3442 organic matter, and 123 parts of inorganic matter. After growing and flowering the plants were examined; in some instances those grown in the dark contained the greatest proportion of inorganic matters, whilst in other cases they were found to contain less, than those grown in light. The average of the whole series was

	Organic matter.	Inorganic matter.
Plants grown in water; light	. 9231	769
——— dark	. 9252	748
Plants grown in sand; light	. 8837	1163
——— dark	. 8872	1128
Plants grown in soil; light	. . 8948	1052
——— dark	. 8885	1115

The differences in the quantity of inorganic matter between those grown in light, and those grown in darkness, were comparatively small; it is evident however that there was no great deficiency of inorganic matter in the plants which grew in the dark; and this was the result arrived at from numerous experiments on other plants. In many cases it was found that the plants which grew in the dark, contained the greatest quantity of inorganic matter; but this was not always the case; and the general conclusion appeared to be that light does not exert any decided influence on the absorption of these substances. In the experiment on Hyacinths just described, some remarkable effects were observed, which though not altogether new, are worthy of record. The plants which grew in the dark were much the largest and much the most succulent, the leaves and stems were perfectly white, but the flowers were in all cases quite as brilliant in colour as those which grew in light; they were however nearly devoid of scent. The colour of those which grew in the dark appeared to be more permanent than the others, for, on drying, they retained their colour perfectly; whilst those which grew in light, faded, and soon became dingy.

A number of experiments were also made to determine what influence the SALTS OF AMMONIA HAD ON THE ABSORPTION OF EARTHY MATTERS, and their result was more definite; it appeared that salts of Ammonia almost always caused an increased absorption of inorganic substances, and more especially influenced the absorption of Potash from the soil, and the formation of Nitre. It had been anticipated from previous experiments, that salts of Ammonia would, by causing plants to grow more vigorously, enable them to take more potash &c. from the soil, so that the whole quantity of inorganic matter which each plant contained, would be increased, but that the relation which existed between it, and the organic matter would be unaltered. The result of a number of

experiments however shewed, that the proportion of inorganic to organic matter, was increased in a greater proportion by salts of Ammonia than by salts of the fixed Alkalies. The following are a few examples of their effects.

Perfectly similar plants of broad leaved summer Spinach were manured, some with Sulphate of Ammonia, and others with Nitrate of Potash; the salts being applied in tolerably large quantity, as a top dressing. Both manures produced a remarkable effect, increasing the size of the leaves very greatly, and causing the plants to grow with the utmost vigour. On examination they were found to consist of

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in 10000 pts. dry.
Manured with Sulphate of Ammonia	leaves	9229	589	182	2370
Do. do. do.	stems	9601	288	111	2791
Manured with Nitrate of Potash	leaves	9098	717	185	2057
Do. do. do.	stems	9586	310	104	2516

By the last column it appears, that a considerably larger quantity of inorganic matter was taken up, by the plants manured with sulphate of Ammonia, than by those treated with Nitrate of Potash; the former also were the most succulent, but in size and appearance when growing, there was no perceptible difference.

A similar experiment was made with Shallots. The colour of the plants was much darkened, and their size was increased, but not to the same extent as with the Spinach. The Shallots contained

	Water.	Organic matter.	Inorganic matter.	Inorganic matter in 10000 pts. dry.
Manured with Sulphate of Ammonia	8686	1221	93	717
Manured with Nitrate of Soda	8455	1450	95	619

A third experiment on Tobacco also gave a similar result; in this case Phosphate of Ammonia was compared with Nitrate of Potash. The plants were examined after flowering, and were much older than those described in a previous experiment, (p. 39.) The composition of the leaves and stalks was

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in 10000 pts. dry.
Manured with Phosphate of Ammonia	leaves	8315	1340	345	2047
Do. do. do.	stalks	7948	1930	122	596
Manured with Nitrate of Potash	leaves	8370	1300	330	2006
Do. do. do.	stalks	7838	2040	122	566

In order to facilitate subsequent experiments, and to supply data for any calculations, which might be required, it appears desirable to ascertain by careful experiments, the exact quantity of inorganic matter taken up from the soil by the more ordinary plants when growing in full vigour. Accordingly, a series of the most important vegetables, herbs, and fruits, in the Gardens of the Society, has been submitted to this kind of investigation, and a portion of the results is embodied in the following Table; which shews the proportion of water, organic and inorganic matter contained in the various plants examined, together with the proportion which the inorganic bore to the organic part of the dry plant. The plants were all carefully selected, none but clean healthy specimens being taken; they were dried in a stove at a temperature of about 200° Fahr.; and were considered dry when several hours exposure to that temperature occasioned no further reduction in weight. The dry plants were burnt to coal on porcelain, or polished iron plates heated by gas lamps, and the coals incinerated at the lowest possible temperature in platinum basins.

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in Dry Plant.
1. Artichoke, Globe	heads	8598	1309	93	665
2. ——— Do.	leaves	8944	943	113	1073
3. ——— Jerusalem	tubers large	7852	2028	120	558
4. ——— Do.	tubers small	7566	2298	136	562
5. Asparagus, heads	large	9210	735	55	705
6. ———	middling	9239	708	53	700
7. ———	small	9132	802	66	767
8. Beans, French, forced	pods	9317	619	64	945
9. ——— Haricot, noire de Belge	pods	9223	727	60	762
10. ——— Scarlet-runners	pods	9451	483	66	1213
11. ——— Broad Windsor	plants in blossom	8998	891	111	1111
12. ——— Do.	without shells	8560	1363	77	538
13. ——— Do.	shells alone	9042	889	69	725
14. ——— Kidney	leaves	8781	854	365	2995
15. ——— Early Mazagan	plants	9110	767	123	1390
16. Beet, Bassano	roots	8730	1151	111	870
17. —— Do.	leaves	8700	1109	191	1433
18. —— Castelnaudary	roots	8501	1390	109	729
19. —— Do.	leaves	8877	967	156	1396
20. —— White sugar	roots	8690	1198	112	857
21. —— Do.	leaves	8905	849	146	1335
22. —— Whyte's Dark red	roots	8962	909	129	1243
23. —— Red-stalked Leaf	roots	8258	1628	114	657
24. —— Do.	leaves	8799	1012	189	1578
25. —— Yellow-stalked Leaf	roots	8269	1605	126	725
26. —— Do.	leaves	8782	1081	137	1125
27. —— White-stalked Leaf	roots	7994	1891	115	581
28. —— Do.	leaves	8785	1039	176	1454

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in Dry Plant.
29. Brocoli, Chappel's	heads	9070	854	76	819
30. ——— Do.	leaves	8889	1024	87	788
31. ——— Do.	stalks	8055	1806	139	718
32. ——— Knight's Protecting	heads	8768	1136	96	784
33. ——— Do.	leaves	8770	1140	97	792
34. ——— Do.	stalks	8314	1555	131	721
35. ——— Victoria	heads	9004	908	88	883
36. ——— Do.	leaves	8800	1090	110	919
37. ——— Do.	stalks	8541	1306	153	1049
38. Cabbage, Battersea, very young	leaves	8693	1139	168	871
39. ——— Do. very young	stems	8068	1744	188	975
40. ——— Do. rather larger	plant	9326	604	70	1045
41. ——— Do. full grown	plant	9317	618	65	961
42. ——— Red	plant	8910	993	97	890
43. ——— Do. flowers and flower	stalks	8770	1108	122	993
44. Carrot, young	roots	8972	951	77	750
45. ——— Do.	leaves	8829	963	208	1780
46. ——— Early horn	roots	8800	1100	100	833
47. ——— Do.	leaves	8568	1165	267	1864
48. ——— large	roots	8727	1273	114	900
49. Cauliflower, large Asiatic	heads	9243	680	77	1081
50. ——— Do.	leaves	8929	953	118	1106
51. Celery, Red	stems	9280	597	123	1716
52. ——— Do.	leaves	8109	1545	346	1756
53. ——— White	stems	9387	488	125	2044
54. ——— Do.	leaves	8645	1107	248	1831
55. ——— White blanched	stems	9285	630	85	1195
56. ——— Do.	leaves	8651	1114	235	1737
57. Cucumber, small	fruit	9589	352	59	1440
58. ——— Weedon's large	fruit	9715	237	48	1703
59. Gurken	fruit	9574	378	48	1126
60. Endive, Green	plant	9292	619	91	1286
61. ——— blanched	plant	9402	526	72	1210
62. Garlic	bulbs	8409	1338	153	961
63. ———	leaves	8714	1127	159	1242
64. Gourd	fruit	9376	559	65	1041
65. Kohlrabi, large	roots	8898	1041	61	553
66. ——— small	roots	8646	1240	114	844
67. Kail, Scotch	leaves	8682	1173	145	1100
68. ——— Do.	stems	8058	1807	135	700
69. ——— Do.	flowers	9248	681	71	936
70. Lettuce, Malta	leaves	9590	338	72	1773
71. ——— Swedish	leaves	9558	351	91	2064
72. ——— White Paris Cos	leaves	9505	411	84	1700
73. ——— Green Paris Cos	leaves	9550	373	77	1727
74. Leek, London Flag	bulbs	8611	1277	112	805
75. ——— Do.	leaves	9044	861	95	993
76. Onions, Spring	whole plants	9381	529	90	1461
77. ——— Autumn	bulbs	8586	1352	62	444
78. ——— Do.	leaves	8922	1010	68	635
79. Oxalis Jacquiniana	tubers	9360	602	38	593
80. ———	leaves	8852	951	197	1716
81. Parsnip	roots	7929	1947	124	600
82. Potato, Bread Fruit	plants	8915	887	198	1824
83. ——— Do.	young tubers	7785	2102	113	510
84. ——— Do.	old tubers	7713	2173	114	501
85. ——— Chapman's	apples	9054	887	59	623
86. ——— Do.	young tubers	7238	2562	107	428
87. ——— Purple Kidney	young tubers	7628	2266	106	446
88. ——— Early Manly	young tubers	8135	1773	92	493
89. ——— Lady's Finger	young tubers	7838	2073	89	411
90. ——— Bermuda	tubers	7111	2783	106	366
91. Pea, Knight's Tall Marrow	shelled	8492	1441	67	383
92. ——— Knight's Dwarf Marrow	shelled	8386	1541	73	452
93. ——— Auvergne	shelled	7692	2222	86	376
94. ——— Blue Prussian	shelled	7073	2837	90	308
95. ——— Early Charlton	shelled	8210	1721	69	389
96. ——— Do.	shells	8076	1856	86	316

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in Dry Plant.
97. Rhubarb, Rheum crispum	leaves	8800	1078	122	1023
98. ——— Do.	leaf stalks	9452	487	61	1119
99. ——— Do.	buds	9418	511	71	1232
100. ——— R. Tataricum	leaves	8926	939	135	1263
101. ——— Do.	leaf stalks	9410	512	78	1322
102. ——— Do.	flowers	8726	1190	84	661
103. ——— R. rubrum	leaves	8856	1016	128	1127
104. ——— Do.	leaf stalks	9343	586	71	1086
105. ——— R. undulatum	leaves	8866	1012	112	987
106. ——— Do.	leaf stalks	9334	599	67	1014
107. ——— R. undulatum var.	leaves	9055	830	115	1223
108. ——— Do.	leaf stalks	9465	465	70	1311
109. ——— R. hybridum	leaves	8637	1232	131	963
110. ——— Do.	leaf stalks	9365	567	68	1079
111. ——— Do.	buds	9116	808	76	862
112. ——— R. compactum	leaves	8866	1007	127	1125
113. ——— Do.	leaf stalks	9325	378	97	1441
114. ——— Myatt's Victoria	leaves	8610	1234	156	1123
115. ——— Do.	leaf stalks	9446	492	62	1125
116. ——— R. Emodi	leaves	8696	1142	162	1248
117. ——— Do.	leaf stalks	9318	580	102	1028
118. Radishes	roots	9539	380	81	1764
119. ——— Turnip red	roots	9459	466	75	1385
120. ——— Do.	leaves	9233	565	202	2644
121. ——— Turnip white	roots	9484	438	78	1527
122. ——— Do.	leaves	9249	594	157	2091
123. Salsafy	roots	8377	1523	100	617
124. ———	leaves	8767	1119	114	929
125. Sea kale	young plants	8991	919	90	898
126. ——— blanched	young plants	9238	705	57	747
127. ——— Do.	flowers	9004	848	112	1175
128. Spinach, Flanders	leaves	8926	863	211	1966
129. ——— Lettuce leaved	leaves	8638	1060	302	2219
130. ——— Round leaved	leaves	9242	611	147	1939
131. Savoy	young leaves	9260	660	80	1006
132. ———	old leaves	9101	745	154	1619
133. Shallot, young	bulbs	9091	779	130	1438
134. ——— Do.	leaves	9185	687	128	1573
135. Turnips, White Globe	roots	9369	525	79	1307
136. ——— Do.	roots	9308	588	104	1513
137. ——— Early Dutch, small	roots	9209	706	85	1079
138. ——— Do.	leaves	9062	742	169	2091
139. ——— Early Dutch, large	roots	9173	743	84	1018
140. ——— Do.	leaves	9042	907	151	1580
141. Tomato, large red	plant	9038	762	200	2087
142. ——— Do.	fruit	9592	343	65	1590
143. Burnet	sprigs	8585	1281	134	948
144. Borage	plant	9110	737	153	1721
145. Balm	plant	8582	1228	190	1425
146. Costmary	leaves	8852	943	195	1701
147. Chervil	leaves	8092	1650	256	1353
148. ———	stalks	9260	563	177	2393
149. ———	flowers	8280	1524	196	1142
150. Carraway	leaves	8443	1309	248	1596
151. ———	stalks	8700	1180	120	923
152. ———	flowers	8200	1650	150	833
153. Chicory, (Cichorium Intybus)	leaves	9105	747	148	1658
154. ——— Do.	roots	7776	2137	87	393
155. Clary, (Salvia Sclarea)	leaves	8736	1101	163	1296
156. ——— Do.	stalks	9118	759	123	1402
157. Chenopodium Bonus Henricus	leaves	8772	1057	171	1395
158. ——— Do.	stalks	9630	840	130	1340
159. ——— Do.	flowers	8333	1501	166	995
160. Elder	flowers	8478	1388	134	881
161. Fennel	young leaves	8761	1048	191	1547
162. ———	old leaves	8425	1348	227	1441
163. ———	stalks	9220	616	164	2102

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in Dry Plant.
164. Horseradish . . .	leaves	8496	1300	204	1348
165. ——— . . .	roots	6879	2945	176	564
166. Lovage . . .	leaves	8612	1211	177	1275
167. ——— . . .	stalks	9359	534	107	1764
168. Lavender . . .	plant	7615	2224	161	676
169. ———	flowers	7550	2232	218	892
170. Mustard . .	young plants	9462	436	102	1910
171. Marsh Mallow . .	plant	8420	1356	224	1421
172. Marjoram . . .	plant	8815	1001	184	1558
173. ——— knotted . .	plant	7949	1749	302	1476
174. Parsley, curled . .	leaves	8430	1299	271	1728
175. Patience (Rumex Patientia) .	leaves	8800	1088	112	1101
176. ——— . . .	stalks	9197	729	74	921
177. Peppermint . .	plant	8077	1650	237	1420
178. ——— . . .	leaves	8724	1147	129	1012
179. Rosemary . . .	plant	5239	4527	234	491
180. Rue . . .	plant	7791	2042	167	257
181. Sorrel . . .	leaves	9207	702	91	1152
182. ——— . . .	flowers	8480	1432	88	582
183. ——— French . .	leaves	9354	564	78	1225
184. Southernwood . .	leaves	7787	2034	179	808
185. ——— . .	stalks	5631	4257	112	255
186. Sage, purple . .	leaves	7515	2240	245	988
187. ——— Do. . .	stalks	5332	4476	192	411
188. ——— green . .	leaves	8416	1369	215	1361
189. ——— Do. . . .	stalks	5333	4416	251	539
190. Spearmint . . .	plant	8867	988	145	1285
191. Savory, Summer . .	plant	8252	1553	195	1119
192. ——— Winter . .	plant	6899	2936	165	534
193. Solomon's Seal . .	roots	7522	2406	72	293
194. Thyme . . .	plant	5953	3787	260	644
195. Tansy, curled . . .	leaves	8465	1372	163	1067
196. Tobacco, broad leaved Virginian	young plants	8917	843	240	2215
197. Watercress . . .	plant	9260	633	107	1450
198. Wormwood, Common . .	plant	8193	1597	210	1165
199. ——— Roman . .	plant	7689	2097	214	927
200. Apple . .	blossoms	8424	1478	98	627
201. ——— Dutch Mignonne, .	small unripe	8972	978	50	487
202. ——— Do. . . .	ripe	8559	1420	21	151
203. ——— Court of Wick, .	small unripe	8839	1114	47	411
204. ——— Do. . . .	ripe	8525	1438	37	252
205. ——— Nonpareil . .	ripe	8012	1961	27	140
206. ——— Ribstone Pippin .	ripe	7905	2051	44	214
207. ——— Golden Pippin, .	seedling	8024	1929	47	241
208. ——— Wellington . .	ripe	8376	1595	29	184
209. ——— Blenheim Pippin .	ripe	8486	1491	23	157
210. ——— Golden Harvey . .	ripe	7825	2140	35	162
211. ——— Golden Reinette .	ripe	8399	1578	23	146
212. ——— Canada Reinette . .	ripe	8489	1481	30	198
213. Currants, White Dutch .	ripe	8742	1191	67	533
214. ——— Knight's Sweet Red, .	unripe	8959	986	55	532
215. ——— Do. . .	ripe	8593	1355	52	373
216. ——— Black . .	blossoms	8625	1255	120	872
217. ——— Do. . .	leaves	7404	2342	254	980
218. ——— Black Naples .	unripe	8578	1317	105	741
219. ——— Do. . .	ripe	8023	1879	98	498
220. Cherry, Bigarreau . .	unripe	8792	1157	51	422
221. ——— Do. . .	larger	8503	1447	50	336
222. ——— Do. . .	ripe	8237	1715	48	272
223. ——— Kentish . .	unripe	8682	1270	48	364
224. ——— Do. . .	ripe	8482	1476	42	309
225. Gooseberries . .	young green	9002	954	44	440
226. ——— Woodward's Whitesmith	ripe	8765	1188	47	384
227. ——— Dark Red Rough .	ripe	8572	1373	45	315
228. ——— Red Champagne .	ripe	8447	1516	37	241
229. ——— White Crystal .	ripe	8605	1345	50	412
230. ——— White Walnut .	ripe	8799	1151	50	416

		Water.	Organic matter.	Inorganic matter.	Inorganic matter in Dry plant.
231. ——— Porcupine	ripe	8533	1412	55	379
232. ——— Amber	ripe	8606	1347	47	338
233. ——— Keene's Seedling Warrington	ripe	8705	1245	50	415
234. Grapes, Portugal	ripe	8055	1877	68	353
235. ——— Hamburgh	ripe	8265	1685	50	289
236. ——— Esperione	unripe	9269	669	32	449
237. ——— Do.	ripe	8791	1169	40	295
238. Melon, Green Flesh	ripe	9340	565	95	1439
239. Nectarine, Imperatrice	unripe	9053	893	54	573
240. ——— Do.	ripe	8409	1543	48	1062
241. Orange	ripe	8019	1908	73	371
242. Peach, Late Admirable	unripe	8827	1115	58	494
243. ——— Do.	ripe	8605	1340	52	376
244. ——— Royal George	small	8972	971	57	555
245. ——— Do.	unripe	7812	2093	95	434
246. ——— Do.	ripe	8635	1317	48	357
247. Pear, Catillac	blossoms	8504	1380	115	745
248. ——— Do.	leaves	7752	2085	163	725
249. ——— Do.	unripe	8068	1844	88	455
250. ——— Do.	ripe	8379	1595	26	164
251. ——— Chaumontelle	unripe	7705	2186	109	471
252. ——— Do.	ripe	8436	1530	34	222
253. ——— Easter Beurré	unripe	7590	2304	106	440
254. ——— Do.	ripe	8421	1542	37	235
255. ——— Passe Colmar	unripe	8140	1756	104	566
256. ——— Do.	ripe	8240	1722	38	183
257. ——— Neil	ripe	7907	2022	71	341
258. ——— Glout Morceau	ripe	8354	1605	41	254
259. ——— Duchesse D'Angoulême	ripe	8469	1492	39	260
260. ——— Beurré Diel	ripe	8415	1585	37	237
261. ——— Beurré D'Aremberg	ripe	8376	1579	45	281
262. ——— Napoleon	ripe	8598	1371	31	226
263. Plum, Nectarine	unripe	8885	1070	45	403
264. ——— Do.	ripe	8469	1492	39	254
265. Strawberry, Keen's Seedling	leaves	7543	2209	249	1016
266. ——— Do.	ripe forced fruit	9320	631	49	733
267. ——— Do.	unripe	8698	1229	73	562
268. ——— Do.	ripe	9129	823	48	554

In order to carry out more fully the objects contemplated in the experiments on Savoys and Potatoes already described, a series of experiments were made the succeeding year, on a much larger scale, but with a more limited number of manures. Four plants were selected for the purpose, namely Wheat, Potatoes, Peas and Mangel Wurzel. These experiments are now so far concluded, that the practical effects produced by the different manures, are known; the variations in the chemical composition of the crops, obtained by the manures, is at present being investigated. All the experiments made at the gardens, were under the care of Mr. Robert Thompson. The following is a description of the mode in which the experiments were conducted, the manures employed, and the produce obtained; the chemical enquiries which these experiments give

rise to, and the conclusions which may be drawn from them, will form the subject of a future communication.

A piece of ground divided into twenty-four beds, was sown with Talavera Spring Wheat, drilled in rows, six inches apart on the 21st of March. The ground was tolerably uniform and had not received any manure for some years, having previously been used for the cultivation of garden annuals. It was however in good condition; in fact as the results of the experiments shewed, in rather too good condition for the purpose. On the 19th of April, the plants being fairly up, and from two to four inches in height, the manures were applied, being sown broadcast across the drills. Twenty-two of the squares were manured, two and two, with eleven different substances, whilst the remaining two were left without any manure. On the 1st of June, the plants being then about a foot and a half high, twelve of the squares, eleven of them having different saline manures, and the twelfth being one of those left without any manure, received in addition an equal quantity of silicate of Potash; thus the first square had a saline manure alone, the next had the same saline manure and in addition a quantity of silicate of Potash; the next had a second saline manure, the fourth had the same saline manure, with the addition of silicate of Potash, and so on; one square alone being left without any manure whatever as a standard of comparison. Towards the end of July, the Wheat came into blossom, it was cut at the end of August, and threshed out early in September. During the growth of the plants and ripening of the grain, very marked distinctions were perceptible; these are described in the following details.

1. *Phosphate of Ammonia.* The quantity of this salt taken was rather more than 2 lbs. per rod or 3 cwt. per acre. The value of the salt can hardly be fairly compared with other saline manures, as, the demand for it being very small, it has not yet been made on a scale of any magnitude, and hence it is difficult to state

at what price it might be prepared. The salt employed in this experiment was pure; for practical use of course a commoner and cheaper salt might be employed. The experimental squares were rather less than a rod each, the results are however all calculated for a rod and likewise for the acre.

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	58	14	*per acre*	4	4	18
Grain		10	10			15	21
Straw		42	8		3	0	80
Chaff		5	12			8	29

The proportion of corn to the whole produce therefore was as 1804 to 10000. The average weight of the seeds was ascertained by weighing a known number, generally from 1500 to 2000. One thousand seeds weighed 653 grains. The density of the wheat was found by weighing a given bulk; a brass measure holding exactly the hundredth part of a bushel was used; twelve weighings were made of each sample; and the mean of the whole twelve taken as representing the average specific gravity of the wheat. The average weight of the standard measure full was 4167 grains, hence the bushel would weigh $59\frac{1}{2}$ lbs.

It is necessary to observe that the quantity of corn, its density, and the weight of a thousand grains, as given in the following pages, is throughout deduced from the undressed corn. It was not dressed or screened in any way, but the whole corn, just as it was threshed out, was taken; hence some of the samples appear extremely light and cannot be fairly compared with dressed samples; the weights are merely comparative, but cannot be taken as expressing the real goodness of the corn.

The effect produced on the growth of the young plants by this salt was very marked, in about a week after applying it the plants looked rather poor, a few of them being killed or the leaves turned brown; in three weeks a decided improvement was visible, the blades were larger and greener than those in the squares numbered 3, 4, 5 and 6, and in fact looked very flourishing. The dark

colour of the blades and the superior height of the plants increased, and remained very marked until the wheat came into ear.

2. *Phosphate of Ammonia and Silicate of Potash.* The same quantity of Phosphate of Ammonia was used in this, as in the preceding experiment. The plants received in addition a quantity of pure silicate of Potash, corresponding to a hundred weight and a half per acre. The silicate employed was very pure, having been made by slowly fusing together white quartz sand, previously well boiled in nitro-muriatic acid and thoroughly washed, with pure carbonate of Potash. It was white, perfectly transparent, and entirely soluble in water. The silicate was applied to the plants in solution, a weak solution being poured between the rows, taking care not to wet the blades. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	58	0	*per acre*	4	2	109
Grain		6	8			9	40
Straw		45	7		3	4	105
Chaff		6	1			8	76

The proportion of corn to the whole crop was therefore as 1137 to 10000. One thousand seeds weighed 584 grains. The standard measure full weighed 4070 grains, hence the bushel would weigh $58\frac{1}{4}$ lbs. The remarks just made with respect to No. 1, Phosphate of Ammonia alone, may be equally applied to this square, which like No. 1 might until the plants came into ear be easily distinguished at a distance from the four following squares by the superior height and darker green colour of the blades. The quantity of corn produced both in Nos. 1 and 2 was less than had been expected from the appearance of the plants and the size and quantity of the ears formed; it is probable that a considerable portion of the corn was carried away from both these squares, but more particularly from No. 2, by the birds; it being more exposed than the other squares to their depredations.

3. *Sulphate of Soda.* The substance taken in this experiment was not a pure sulphate of Soda, but the impure salt, called Salt

cake, a substance manufactured on a very large scale by acting on common salt by sulphuric acid, for the purpose of being subsequently converted into carbonate of Soda or "Soda." Its value is about £3. 10*s.* per ton, hence the quantity applied would cost 10*s.* 6*d.* per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	37	13	*per acre*	2	13	14
Grain		8	2			11	70
Straw		25	3		1	15	10
Chaff		4	8			6	46

The proportion of corn to the whole crop was therefore as 2188 to 10000. One thousand seeds weighed 610 grains. The brass standard measure full weighed 4114 grains, consequently the bushel would weigh 58¾ lbs. The plants in this as well as those in the succeeding square, No. 4, had throughout but a sickly appearance, they looked weak, and were a good deal laid by the wind, much more so than the two preceding squares, Nos. 1 and 2, although the latter plants were larger and taller than those in 3 and 4.

4. *Sulphate of Soda and Silicate of Potash.* The plants in the fourth square received these substances, at the rate of 3 cwt. of the former and 1½ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	47	13	*per acre*	3	9	46
Grain		8	3			12	58
Straw		36	10		2	13	62
Chaff		3	0			4	38

The proportion of corn to the whole crop was therefore as 1803 to 10000. One thousand seeds weighed 566 grains. The standard measure full weighed 3987 grains, consequently the bushel would weigh 57 lbs.

5. *Salt.* Common Salt was applied to this square at the rate of 3 cwt. per acre. This, reckoning salt at £1. 15*s.* per ton, would cost 4*s.* 6*d.* per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	56	3	*per acre*	3	19	72
Grain		13	8			18	71
Straw		37	13		2	14	0
Chaff		4	14			7	1

The proportion of corn to the whole crop was therefore as

2339 to 10000. One thousand seeds weighed 731 grains. The standard measure full, weighed 4228 grains, consequently the bushel would weigh $60\frac{1}{2}$ lbs. The plants in this and the succeeding square, No. 6, looked throughout rather better than those in the two preceding squares Nos. 3 and 4; they were not, however, so much better as to have rendered it probable that the crop would be so much larger than Nos. 3 and 4, as the result proved it to be.

6. *Common Salt and Silicate of Potash.* Manured with these substances at the rate of 3 cwt. of the former, and $1\frac{1}{2}$ cwt. of the latter, per acre, the produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	47	13	*per acre*	3	8	44
Grain		8	3			11	81
Straw		36	10		2	12	37
Chaff		3	0			4	38

The proportion of corn to the whole crop was therefore as 1721 to 10000. One thousand seeds weighed 654 grains. The standard measure full weighed 4124 grains, consequently the bushel would weigh 59 lbs.

7. *Muriate of Ammonia.* Manured with this salt at the rate of 3 cwt. per acre, which, reckoning the salt worth £2. 2*s*. per cwt., would cost £6. 6*s*. per acre. In almost all the experiments made at the Horticultural Gardens with the salts of Ammonia, Muriate of Ammonia has produced a greater effect than the Sulphate or even the Phosphate. It is probable that this salt would for many soils be a very valuable manure. The price just quoted, which is that ordinarily stated, is however very high; and it becomes a question of some interest, whether it could not be obtained at a much lower cost. The common Muriate of Ammonia or Sal Ammoniac, is prepared chiefly from the Sulphate of Ammonia and Common Salt, which are mixed and then heated in a subliming apparatus. It is evident that for the purpose of manure, a more impure salt than that prepared by sublimation might be used. Perhaps the best process for preparing it would be to mix together Muriate of

Lime, a substance which can be procured at a very low cost, with Sulphate of Ammonia; when water is present these salts instantly decompose each other. The result of such a mixture would be Muriate of Ammonia and Sulphate of Lime, and would, probably, form an excellent manure. It might also be worth while to form Muriate of Ammonia by mixing Muriate of Lime and the crude Ammoniacal Gas liquor, in which case Muriate of Ammonia and Carbonate of Lime would result. The tarry matter always present in Ammoniacal liquor would perhaps be objectionable, hence the mixture of Sulphate of Ammonia and Muriate of Lime appears preferable. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	57	13	*per acre*	4	2	72
Grain		12	9			17	111
Straw		37	10		2	13	86
Chaff		7	10			10	99

The proportion of corn to the whole crop therefore was as 2176 to 10000. One thousand seeds weighed 700 grains. The standard measure full weighed 4173 grains, hence the bushel would weigh $59\frac{1}{2}$ lbs. In about three weeks from the time of applying the Salt, an evident alteration in the appearance of the wheat became visible; the plants were of a dark green colour, like those which had been manured with Phosphate of Ammonia, but even yet darker. They grew rapidly, the blades were large, and the plants very flourishing; they could readily be distinguished from the plants in 3, 4, 5 and 6, by their superior size and deep green colour. In consequence of the rankness of the plants, they were a good deal laid.

8. *Muriate of Ammonia and Silicate of Potash.* Manured with these substances at the rate of 3 cwt. of the former and $1\frac{1}{2}$ of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	70	3	*per acre*	5	14	65
Grain		10	8			15	0
Straw		67	15		4	17	12
Chaff		1	12			2	53

The proportion of grain to the whole crop therefore was as 1309

to 10000. One thousand seeds weighed 610 grains. The standard measure full weighed 4023 grains; hence the bushel would weigh 57½ lbs. The plants in this, like those in the preceding square, were remarkable for their size and the deep green colour of their blades. They were rather stiffer and therefore less laid than those in No. 7.

9. *Phosphate of Lime.* The Phosphate employed was nearly pure, it was prepared from the super-phosphate of Lime formed by acting on Bone-ash by Sulphuric Acid. The ground was manured with it at the rate of 4½ cwt. per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	52	15	*per acre*	3	15	72
Grain		11	4			16	7
Straw		35	5		2	10	52
Chaff		6	6			9	13

The proportion of grain to the whole crop therefore was as 2123 to 10000. One thousand seeds weighed 628 grains. The standard measure full weighed 4166, hence the bushel would weigh 59½ lbs. The plants in this and the following square were rather poor, and somewhat paler in colour than those in the standard square 13.

10. *Phosphate of Lime and Silicate of Potash.* Manured with these substances at the rate of 4½ cwt. of the former, and 1½ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	55	7	*per acre*	3	19	9
Grain		11	9			16	37
Straw		39	2		2	15	105
Chaff		4	12			6	91

The proportion of grain to the whole crop therefore was as 2076 to 10000. One thousand seeds weighed 585 grains. The standard measure full weighed 4015 grains, hence the bushel would weigh 57¼ lbs.

11. *Muriate of Potash.* This Salt was applied at the rate of 3 cwt. per acre; it was nearly pure, and cost 18*s.* per cwt. There is however an impure Muriate of Potash known in trade under the

name of Petre salt, and costing about 4*s.* per cwt. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	58	10	*per acre*	4	3	70
Grain		13	10			19	25
Straw		39	10		2	16	75
Chaff		5	6			7	82

The proportion of grain to the whole crop therefore was as 2272 to 10000. One thousand seeds weighed 712 grains. The standard measure full, weighed 4233 grains; hence the bushel would weigh $60\frac{3}{4}$ lbs.

During the first few weeks after the application of this Salt, no effect whatever was perceptible; the plants looked poor, they grew up thin, and the blades were small, but they were stiff and the straw strong. When the wheat came into ear it looked far better than it had previously done, and the stiffness of the straw became more evident, for when those which had received Ammoniacal manures were all laid, the plants in this square were not laid at all. During the filling of the grain, a very remarkable effect was observed; the straw ripened and became of a bright yellow colour some time before that in most of the surrounding squares began to change. This effect which was very distinct and marked was perceived only in those squares which had been manured with Muriate and Sulphate of Potash, viz. 11, 12, 21 and 22, but in the two latter cases the appearance was less distinct than in those to which the Muriate of Potash had been applied.

12. *Muriate of Potash and Silicate of Potash.* These substances were applied at the rate of 3 cwt. of the former and $1\frac{1}{2}$ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	61	5	*per acre*	4	7	1
Grain		10	7			14	24
Straw		47	7		3	7	94
Chaff		3	7			4	107

The proportion of grain to the whole crop therefore was as 1633 to 10000. One thousand seeds weighed 619 grains. The

standard measure full, weighed 4081 grains; hence the bushel full would weigh $58\frac{1}{2}$ lbs.

13. *No Manure.* This square, which was reserved as a standard of comparison with the other squares, received no manure whatever. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	40	6	*per acre*	2	17	77
Grain		7	10			10	98
Straw		30	2		2	3	7
Chaff		2	10			3	84

The proportion of grain to the whole crop therefore was as 1885 to 10000. One thousand seeds weighed 596 grains. The standard measure full weighed 4107 grains; hence the bushel would weigh $58\frac{3}{4}$ lbs.

In the early part of the experiment, shortly after the application of the manures, the plants in this square looked, if anything, rather better than any of the others; they seemed larger and fuller, and consequently this square appeared greener than those around it. After a few weeks however many of the squares, and more particularly those which had been treated with ammoniacal manures, far surpassed this in the size and colour of the plants. It was evident, as the wheat came into ear, that the straw was far weaker than that in the neighbouring squares; it was far more easily laid and recovered itself less rapidly than the wheat in other squares, even though the latter were larger and taller plants. On comparing the produce of this square with that of the others, it will be perceived that the quantity of grain is less than in any of the others, with the exception of that manured with Phosphate of Ammonia and Silicate of Potash in No. 2. It is probable, as has already been stated, that a considerable portion of the grain in that square was destroyed by birds.

14. *Silicate of Potash.* This square was manured with Silicate of Potash, at the rate of $1\frac{1}{2}$ cwt. per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	48	6	*per acre*	3	9	11
Grain		9	3			13	12
Straw		34			2	8	62
Chaff		5	3			7	49

The proportion of grain to the whole crop therefore was as 1905 to 10000. One thousand seeds weighed 553 grains. The standard measure full weighed 3942 grains; hence the bushel would weigh 56¼ lbs. There was a decided improvement in the appearance of this wheat, over that of the standard square; the plants were larger, the ears finer, and the straw stiffer.

15. *Sulphate of Lime or Gypsum.* Applied at the rate of 4½ cwt. per acre; it was finely powdered and spread over the ground as uniformly as possible. The price of Gypsum varies a good deal; reckoning it at 35*s.* per ton, the above quantity would cost 7*s.* 10½*d.* per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	60	11	*per acre*	4	6	90
Grain		14	0		1	0	6
Straw		41	5		2	19	8
Chaff		5	6			7	76

The proportion of grain to the whole crop therefore was, as 2310 to 10000. One thousand seeds weighed 639 grains. The standard measure full weighed 4204 grains, hence the bushel would weigh 60 lbs. Within a short time from the application of the Gypsum, the wheat exhibited an improved appearance, the blades were longer, and more healthy looking, though paler in colour than those of the standard. This superiority was evident during the whole time of their growth, but the difference was not so great as to make it probable that there would be so great a difference in the produce as there proved to be.

16. *Sulphate of Lime and Silicate of Potash.* These substances were applied at the rate of 4½ cwt. of the former, and 1½ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	71	9	*per acre*	5	2	38
Grain		14	3		1	0	37
Straw		51	12		3	13	107
Chaff		5	10			8	6

The proportion of grain to the whole crop therefore was as 1986 to 10000. One thousand seeds weighed 645 grains. The standard measure full weighed 4077 grains, hence the bushel

would weigh $58\frac{1}{4}$ lbs. The same observations made to Gypsum alone 15 may be applied to this square, the plants in it were rather finer than in No. 16.

17. *Sulphate of Ammonia.* This salt was applied at the rate of 3 cwt. per acre. Sulphate of Ammonia is now made on a large scale from the refuse ammoniacal liquor of the gas works, either by the addition of Sulphuric Acid, or by a cheap sulphate, such as the Sulphate of Iron. The price of Sulphate of Ammonia is about 16*s*. per cwt.; the abovementioned quantity therefore would cost £2. 8*s*. per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	60	3	*per acre*	4	6	9
Grain		12	6			17	82
Straw		41	7		2	19	26
Chaff		6	6			9	13

The proportion of grain to the whole crop therefore was as 2061 to 10000. One thousand seeds weighed 651 grains. The standard measure full weighed 4166 grains, hence the bushel would weigh $59\frac{1}{2}$ lbs. The plants in this and the following square 18 began to show a marked difference in about three weeks after the application of the salt; the plants grew very vigorously, and had the same deep green which distinguished those manured with Muriate of Ammonia, 7 and 8. If there was any visible difference between the effects produced by the Muriate and Sulphate, it was in favour of the former; the plants manured with that salt were perhaps a little more luxuriant than those treated with the Sulphate. The plants in this and the following square were rather less laid than those manured with the Muriate 7 and 8.

18. *Sulphate of Ammonia and Silicate of Potash.* These substances were applied at the rate of 3 cwt. of the former and $1\frac{1}{2}$ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	50	6	*per acre*	4	6	41
Grain		11	11			16	85
Straw		46	2		3	5	100
Chaff		2	9			3	80

The proportion of grain to the whole produce therefore was as 1940 to 10000. One thousand seeds weighed 619 grains. The standard measure full weighed 4096 grains, hence the bushel would weigh 58½ lbs.

19. *Sulphate of Magnesia, Epsom Salts.* This salt was applied at the rate of 3 cwt. per acre. Its value is about £12. per ton, hence the quantity used would cost £1. 16*s.* per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	56	7	*per acre*	4	0	76
Grain		12	0			17	17
Straw		37	11		2	13	100
Chaff		6	12			9	71

The proportion of grain to the whole crop therefore was as 2125 to 10000. One thousand seeds weighed 671 grains. The standard measure full weighed 4170 grains, hence the bushel would weigh 59½ lbs. The effect produced by this salt on the growth of the wheat appeared to be small, the plants looked very little better than those in the standard square; the straw appeared to be rather stronger.

20. *Sulphate of Magnesia and Silicate of Potash.* These substances were applied at the rate of 3 cwt. of the former and 1½ cwt. of the latter per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	58	13	*per acre*	4	4	6
Grain		12	5			17	65
Straw		43	8		3	2	15
Chaff		3	0			4	38

The proportion of grain to the whole crop therefore was as 2091 to 10000. One thousand seeds weighed 624 grains. The standard measure full weighed 4106 grains, hence the bushel would weigh 58¾ lbs.

21. *Sulphate of Potash.* This salt was applied at the rate of 3 cwt. per acre. Sulphate of Potash is the residue of the ordinary process for the manufacture of Nitric Acid, in which Nitrate of Potash is decomposed by Sulphuric Acid. The price of the Sulphate varies, in part depending on the price of the Nitrate, its

average value is about £14 per ton, hence the above quantity would cost £2. 2*s*. per acre. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	47	7	*per acre*	3	7	87
Grain		10	11			15	34
Straw		30	13		2	3	107
Chaff		5	15			8	58

The proportion of grain to the whole crop therefore was as 2257 to 10000. One thousand seeds weighed 651 grains. The standard measure full weighed 4195 grains, hence the bushel would weigh 60 lbs.

This salt decidedly produced a beneficial effect on the wheat; the plants were large and flourishing, the straw appeared stiffer than most of the others, and when the wheat had come into ear and the grains were ripening, the remarkable change in colour adverted to when describing the effect produced by Muriate of Potash, was observed.

22. *Sulphate of Potash and Silicate of Potash.* These substances were applied at the rate of 3 cwt. of the former and 1½ cwt. of the latter, the produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	72	0	*per acre*	5	4	66
Grain		12	0			19	23
Straw		55	4		3	18	64
Chaff		4	12			6	91

The proportion of grain to the whole crop was therefore as 1836 to 10000. One thousand seeds weighed 610 grains. The standard measure full weighed 4069 grains. Hence the bushel would weigh 58¼ lbs. The plants in this square were very large and healthy, the straw was remarkably stiff, and the ears were larger and full. On comparing together all the squares manured with Silicate of Potash, the plants in this square appeared the finest.

23. *Nitrate of Soda.* This salt was applied at the rate of 3 cwt. per acre. At the present price of £17. per ton, this quantity would cost £2. 11*s*. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	59	6	*per acre*	4	4	109
Grain		11	10			16	72
Straw		41	11		2	19	70
Chaff		6	1			8	79

The proportion of grain to the whole crop therefore was as 1958 to 10000. One thousand seeds weighed 651 grains. The standard measure full weighed 4242 grains. Hence the bushel would weigh 60 ½ lbs. The Nitrate of Soda in this and the following square produced a very luxuriant growth, closely resembling that caused by the salts of Ammonia; the plants appeared to be weaker than those manured with ammoniacal compounds, for though no larger, they were more laid than the others were.

24. *Nitrate of Soda and Silicate of Potash.* These substances were applied at the rate of 3 cwt. of the former, and 1 ½ of the latter. The produce was

		lbs.	oz.		ton.	cwt.	lbs.
Whole crop	*per rod*	56	15	*per acre*	4	1	46
Grain		9	8			13	63
Straw		42	4		3	0	46
Chaff		5	3			7	49

The proportion of grain to the whole crop therefore was as 1666 to 10000. One thousand seeds weighed 562 grains. The standard measure full weighed 3952 grains. Hence the bushel would weigh 56 ½ lbs.

From the comparatively small scale on which these experiments were made, it is evident that the results cannot be considered as giving exactly the relative effects produced by the different manures employed, the experiments were however carefully made, and possess considerable interest in themselves, even independent of the chemical enquiries to which they will hereafter lead.

Perhaps the fairest mode of judging of the effect produced by these manures, was to compare the growing crops together, previous to their coming into ear, the differences were then very marked, it was evident that by far the greatest effect was throughout produced by the salts of Ammonia and the Nitrate of Soda. The most remarkable effect of all was produced by Muriate of Ammonia; the plants manured with this salt were distinguished not only by the luxuriance of their growth, but likewise by the very deep blue green colour of the foliage, those manured with Sulphate of

Ammonia were not quite so rank, whilst those manured with Phosphate of Ammonia and Nitrate of Soda, though as large and flourishing as those treated with Muriate of Ammonia, were not quite so dark in colour. Next in size and appearance were the plants manured with Sulphate of Potash, then those manured with Sulphate of Lime and Sulphate of Magnesia. The Muriate of Potash appeared to exert but little influence until the wheat came into ear. The other salts did not in any material way affect the appearance of the wheat. A slight beneficial effect was throughout produced by the Silicate of Potash, each square to which it had been applied, in conjunction with a saline manure, looked better than the corresponding square to which the Silicate had not been applied.

The crops were attentively watched from time to time to ascertain whether any of them were more liable to blight or diseases than the others, but no such effect was observed, a few smutty ears were found in most of the squares, and in a few places red rust appeared, but it did not seem that there was any connexion between those diseases and the manures employed.

A number of grains of wheat selected from each square, was sown in similar soil, and exposed to the same circumstances, to ascertain whether there was any difference in the time required for germination. In the first trial, considerable differences appeared to exist in the rapidity of germination; the seeds from those squares which had been manured with Silicate of Potash, all came up first; this was however probably due to some accidental circumstance, for on repeating the experiment with greater care no appreciable difference was perceptible.

For the convenience of reference some of the numerical results of the preceding experiment are arranged in the following tables.

I. Table shewing the whole quantity of grain, and also the increased produce with each manure, calculated for the acre.

	Whole grain.			Increase.	
	ton.	cwt.	lbs.	cwt.	lbs.
2. Phosphate of Ammonia and Silicate of Potash		9	40		
13. No Manure		10	89		
3. Sulphate of Soda		11	70		84
6. Common Salt and Silicate of Potash		11	81		95
4. Sulphate of Soda and Silicate of Potash		12	58	1	72
14. Silicate of Potash		13	12	2	34
24. Nitrate of Soda and Silicate of Potash		13	63	2	77
12. Muriate of Potash and Silicate of Potash		14	24	3	38
8. Muriate of Ammonia and Silicate of Potash		15	0	4	14
1. Phosphate of Ammonia		15	21	4	25
21. Sulphate of Potash		15	34	4	48
9. Phosphate of Lime		16	7	5	21
10. Phosphate of Lime and Silicate of Potash		16	37	5	51
23. Nitrate of Soda		16	72	5	86
18. Sulphate of Ammonia and Silicate of Potash		16	85	5	99
19. Sulphate of Magnesia		17	17	6	31
20. Sulphate of Magnesia and Silicate of Potash		17	65	6	79
17. Sulphate of Ammonia		17	82	6	66
7. Muriate of Ammonia		17	111	7	13
5. Common Salt		18	71	7	85
22. Sulphate of Potash and Silicate of Potash		19	23	8	36
11. Muriate of Potash		19	35	8	39
15. Sulphate of Lime	1	0	6	9	20
16. Sulphate of Lime and Silicate of Potash	1	0	37	9	51

II. Table shewing the whole crop of wheat, and also the increase of produce caused by each manure, calculated for the acre.

	Whole crop.			Increase.		
	ton.	cwt.	lbs.	ton.	cwt.	lbs.
3. Sulphate of Soda	2	13	4			
13. No Manure	2	17	77			
21. Sulphate of Potash	3	7	87		10	10
6. Common Salt and Silicate of Potash	3	8	44		10	79
4. Sulphate of Soda and Silicate of Potash	3	9	46		11	81
14. Silicate of Potash	3	9	11		11	44
9. Phosphate of Lime	3	15	72		17	107
10. Phosphate of Lime and Silicate of Potash	3	19	9	1	1	44
5. Common Salt	3	19	72	1	1	107
19. Sulphate of Magnesia	4	0	76	1	2	111
24. Nitrate of Soda and Silicate of Potash	4	1	46	1	3	81
2. Phosphate of Ammonia and Silicate of Potash	4	2	109	1	5	32
7. Muriate of Ammonia	4	2	72	1	4	107
11. Muriate of Potash	4	3	70	1	5	105
20. Sulphate of Magnesia and Silicate of Potash	4	4	6	1	6	41
1. Phosphate of Ammonia	4	4	18	1	6	53
23. Nitrate of Soda	4	4	109	1	7	32
15. Sulphate of Lime	4	6	90	1	9	13
17. Sulphate of Ammonia	4	6	9	1	9	44
18. Sulphate of Ammonia and Silicate of Potash	4	6	41	1	8	76
12. Muriate of Potash and Silicate of Potash	4	7	1	1	9	36
16. Sulphate of Lime and Silicate of Potash	5	2	38	2	4	73
22. Sulphate of Potash and Silicate of Potash	5	4	66	2	6	101
8. Muriate of Ammonia and Silicate of Potash	5	14	64	2	16	99

III. Table shewing the Average Weight of 1000 grains, the Average Weight of the One hundredth part of a Bushel, the Average Weight of a Bushel, calculated from the same, and the Average Number of Seeds in the One hundredth part of a Bushel.

	Average Weight of 1000 Seeds.	Average Weight of the Standard Measure.	Average Weight in lbs. per Bushel.	Average Number of Seeds in the Standard Measure.
	grains.	grains.	lbs.	seeds.
14. Silicate of Potash . . .	553	3942	56¼	7128
24. Nitrate of Soda and Silicate of Potash .	562	3952	56½	7032
4. Sulphate of Soda and Silicate of Potash .	566	3987	57	7040
2. Phosphate of Ammonia and Silicate of Potash	584	4070	58¼	6969
10. Phosphate of Lime and Silicate of Potash .	585	4015	57¼	6859
13. Nothing	596	4107	58¾	6890
3. Sulphate of Soda . . .	610	4114	58¾	6744
8. Muriate of Ammonia and Silicate of Potash	610	4023	57½	6595
22. Sulphate of Potash and Silicate of Potash .	610	4069	58¼	6654
12. Muriate of Potash and Silicate of Potash	619	4081	58½	6592
18. Sulphate of Ammonia and Silicate of Potash	619	4096	58½	6616
20. Sulphate of Magnesia and Silicate of Potash	624	4106	58¾	6584
9. Phosphate of Lime . . .	628	4166	59½	6633
15. Sulphate of Lime . . .	639	4204	60	6579
16. Sulphate of Lime and Silicate of Potash .	645	4077	58¼	6326
17. Sulphate of Ammonia . .	651	4166	59½	6399
21. Sulphate of Potash . . .	651	4195	60	6443
23. Nitrate of Soda . . .	651	4242	60½	6516
1. Phosphate of Ammonia . .	653	4167	59½	6381
6. Salt and Silicate of Potash . .	654	4124	59	6305
19. Sulphate of Magnesia . .	671	4170	59½	6065
7. Muriate of Ammonia . .	700	4173	59½	5961
11. Muriate of Potash . . .	712	4233	60¾	5945
5. Common Salt . . .	731	4228	60½	5785

IV. Table shewing the relative Value of the different Experimental Crops, as determined by an Eminent Corn Factor, to whom a series of Undressed Samples were submitted, November 1843.

Manure used.	Value per Bushel.				
	s.	d.		s.	d.
8. Muriate of Ammonia and Silicate of Potash . .	53		to	54	
24. Nitrate of Soda and Silicate of Potash . .	54			54	6
2. Phosphate of Ammonia and Silicate of Potash .	54	6			
4. Sulphate of Soda and Silicate of Potash . .	54	6			
14. Silicate of Potash . . .	54	6			
18. Sulphate of Ammonia and Silicate of Potash .	55				
20. Sulphate of Magnesia and Silicate of Potash .	55				
10. Phosphate of Lime and Silicate of Potash .	55				
22. Sulphate of Potash and Silicate of Potash .	55	6	to	56	
16. Sulphate of Lime and Silicate of Potash .	55		to	56	6
12. Muriate of Potash and Silicate of Potash .	55		to	55	6
6. Common Salt and Silicate of Potash . .	55		to	55	6
17. Sulphate of Ammonia	55		to	56	
7. Muriate of Ammonia	55	6			
1. Phosphate of Ammonia	55	6	to	55	
9. Phosphate of Lime	56				
13. No manure	56				
15. Sulphate of Lime	56				
19. Sulphate of Magnesia . . .	56				
21. Sulphate of Potash	56				
23. Nitrate of Soda	56		to	56	6
3. Sulphate of Soda	56		to	57	
5. Common Salt	56	6	to	57	6
11. Muriate of Potash	56	6	to	57	6

V. Table of the produce of Straw, shewing the increase produced by certain Manures.

	Whole straw.			Increase.		
	ton.	cwt.	lbs.	ton.	cwt.	lbs.
3. Sulphate of Soda . . .	1	15	10			
21. Sulphate of Potash . . .	2	3	107			
14. Silicate of Potash . . .	2	8	62			
9. Phosphate of Lime . .	2	10	52			
6. Common Salt and Silicate of Potash .	2	12	37			
4. Sulphate of Soda and Silicate of Potash .	2	13	62			
7. Muriate of Ammonia . . .	2	13	86			
19. Sulphate of Magnesia . .	2	13	100			
5. Common Salt . . .	2	14	100			
10. Phosphate of Lime and Silicate of Potash .	2	15	105			
11. Muriate of Potash . . .	2	16	75			
15. Sulphate of Lime . . .	2	19	8			
17. Sulphate of Ammonia . .	2	19	26			
23. Nitrate of Soda . . .	2	19	70			
24. Nitrate of Soda and Silicate of Potash .	3	0	46			
1. Phosphate of Ammonia . . .	3	0	80			
20. Sulphate of Magnesia and Silicate of Potash	3	2	15			
13. No Manure . . .	3	3	7			
2. Phosphate of Ammonia and Silicate of Potash	3	4	105		1	98
18. Sulphate of Ammonia and Silicate of Potash	3	5	100		2	93
12. Muriate of Potash and Silicate of Potash .	3	7	94		4	87
16. Sulphate of Lime and Silicate of Potash .	3	13	107		10	100
22. Sulphate of Potash and Silicate of Potash .	3	18	64		15	57
8. Muriate of Ammonia and Silicate of Potash .	4	17	12	1	14	5

A series of experiments with similar saline manures was also made with POTATOES. Twelve squares were planted with Bread fruit Potatoe on the 20th of March. The cuttings were as nearly as possible of the same size, and came up tolerably regularly. On the 12th of May, when most of the young plants were from two to four inches above ground, the manures were applied; they were not sown broadcast over the whole bed, but sprinkled as uniformly as possible on each side of the row of young plants, to a distance of about six inches. The salts used were the same as those applied to the wheat, with the exception of the Silicate of Potash, namely, the Phosphate, Muriate, and Sulphate of Ammonia, Sulphate, Muriate, and Nitrate of Soda, Sulphate and Muriate of Potash, Sulphate and Phosphate of Lime, and Sulphate of Magnesia, whilst the twelfth square was left without any manure as a standard of comparison. In about three weeks after applying the manure, it was evident that four of the squares, namely, those to which the Salts of Ammonia and Nitrate of Soda, had been applied, were distinguished from the others by more vigorous growth, and rather

darker foliage. About five weeks after applying the salts, the standard square and that treated with Sulphate of Lime, were the poorest, those which had Muriate of Potash and Phosphate of Lime, were rather finer; those manured with Sulphates of Soda, Magnesia, and Potash, still better; that which had been manured with common Salt, resembled in size and appearance those which had been treated with the sulphate, but the foliage was remarkably pale in colour; whilst those manured with Ammoniacal Salts and Nitrate of Soda, were distinguished from all the others, by the plants being several inches higher, having much thicker stems, and a rich dark green foliage. One of the rows in the bed manured with Muriate of Ammonia had from some cause failed, at least the plants had not come up at the time of applying the manures, within a very short time afterwards, however, they came up, and grew with such vigour and luxuriance that in a few weeks it was impossible to distinguish them from the other plants similarly manured. The plants continued to grow until the end of August, and the same general distinctions already mentioned, were evident to the last. The ammoniacal manures and the Nitrate of Soda produced the finest plants, but the differences between the squares though evident, were far less marked at the end of August, than they had been at the end of June, and through the whole of July. It appeared as if the four manures just referred to, produced a powerful effect on the plants for the first six weeks, and caused them to grow with great vigour, so that they soon came to their full size, after which they ceased to grow; whilst the plants in the other squares never made any rapid growth, but continued to grow slowly and steadily until the tops began to die off. In the middle of September, as the greater part of the tops were either dead or dying, they were gathered, and the potatoes taken up. The different manures were all applied at the rate of three hundred weight per acre, excepting the Phosphate and Sulphate of Lime, both of which were used at the rate of four and a half hundred weight per acre.

The quantity of Potatoes yielded by each square was as follows : the quantity of large or marketable Potatoes being distinguished from the small ones.

No. 1. Manured with Phosphate of Ammonia at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	53	*per acre*	11	16	78
Small tubers			17		1	13	40
Total		1	72		13	2	6
Dry haulm			6¼			9	0

No. 2. Manured with Sulphate of Soda at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	59	*per acre*	12	4	74
Small tubers			15		1	2	27
Total		1	74		13	6	101
Dry haulm			5¾			8	4

No. 3. Manured with Common Salt at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	82	*per acre*	13	18	2
Small tubers			17		1	4	70
Total		1	99		15	2	72
Dry haulm			8			11	35

No. 4. Manured with Muriate of Ammonia at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	2	10	*per acre*	16	15	7
Small tubers			17		1	6	68
Total		2	27		17	1	75
Dry haulm			11			15	77

No. 5. Manured with Phosphate of Lime at the rate of $4\frac{1}{2}$ cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	47	*per acre*	11	7	20
Small tubers			21		1	10	21
Total		1	68		12	17	41
Dry haulm			5¼			7	61

No. 6. Manured with Muriate of Potash at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	84	*per acre*	14	1	22
Small tubers			13			19	33
Total		1	97		15	0	55
Dry haulm			7½			10	69

No. 7. Not manured at all. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	31	*per acre*	10	4	105
Small tubers			16		1	3	4
Total		1	47		11	7	109
Dry haulm			4¼			6	39

No. 8. Manured with Sulphate of Lime at the rate of 4½ cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	32	*per acre*	10	6	59
Small tubers			17		1	5	47
Total		1	49		11	11	105
Dry haulm			4			5	96

No. 9. Manured with Sulphate of Ammonia, at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	74	*per acre*	13	6	101
Small tubers			16		1	3	4
Total		1	90		14	9	105
Dry haulm			5¾			8	27

No. 10. Manured with Sulphate of Magnesia at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	70	*per acre*	13	0	61
Small tubers			13			19	33
Total		1	83		13	19	94
Dry haulm			6			8	71

No. 11. Manured with Sulphate of Potash at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	42	*per acre*	11	0	92
Small tubers			14		1	0	73
Total		1	56		12	1	53
Dry haulm			3½			4	96

No. 12. Manured with Nitrate of Soda at the rate of 3 cwt. per acre. The produce was

		cwt.	lbs.		ton.	cwt.	lbs.
Large tubers	*per rod*	1	84	*per acre*	14	1	22
Small tubers			20		1	8	67
Total		1	104		15	9	88
Dry haulm			7¼			10	36

The proportion of tubers is by no means what might have been expected from the apparent size of the plants; there was very little difference perceptible between the plants manured with the three salts of Ammonia, the plants were equally healthy and no difference

could be seen in their size or appearance, yet the produce varied greatly, for on comparing the effect produced, it appears that the sulphate produced about twice the effect of the phosphate; and the muriate about twice as much as the sulphate. The following table exhibits the relative effect produced by each manure, on the tubers as well as on the haulm, the weight of the green haulm may readily be calculated by reckoning 100 lbs. of the green for every 11 lbs. of the dry plant.

Manure.	Whole produce tubers.			Increase per acre.			Large tubers.			Increase per acre.			Whole haulm.		Increase per acre.	
	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.	cwt.	lbs.	cwt.	lbs.
None . . .	11	7	109				10	4	105				6	39		
Sulphate of Lime .	11	11	105		3	108	10	6	59		1	66	5	96		
Sulphate of Potash .	12	1	53		13	56	11	0	92		13	99	4	96		
Phosphate of Lime .	12	17	41	1	9	44	11	7	20	1	2	27	7	61	1	22
Phosphate of Ammonia	13	2	6	1	14	9	11	16	78	1	11	83	9	0	2	73
Sulphate of Soda .	13	6	111	1	19	8	12	4	74	1	19	81	8	4	1	77
Sulphate of Magnesia	13	19	94	2	11	97	13	0	61	2	15	68	8	71	2	32
Sulphate of Ammonia	14	9	105	3	1	108	13	6	101	3	1	108	8	27	1	100
Muriate of Potash .	15	0	55	3	12	58	14	1	22	3	16	29	10	69	4	30
Common Salt .	15	2	72	3	14	75	13	18	2	3	13	9	11	35	4	108
Nitrate of Soda .	15	9	89	4	1	92	14	1	22	3	16	29	10	36	3	109
Muriate of Ammonia .	17	1	75	5	13	78	16	15	7	6	10	14	15	77	9	38

Shortly after this experiment was commenced, three other squares of bread fruit Potato, in another part of the garden, were manured with Carbonate of Ammonia, Nitrate of Ammonia, and Muriate of Lime. The soil where these substances were applied, was richer, than where the above described experiments were made; and the fact that the salts were applied rather late, renders it impossible to compare the produce of the two experiments. The Nitrate and Carbonate of Ammonia, produced far less effect either on the haulm or tubers, than the other salts of Ammonia, which were applied to the plants in a younger state. The Muriate of Lime did not exert much influence on the growth of the tops, but it increased the yield of tubers nearly one fourth.

A third series of experiments was made with Peas. Twelve squares were sown with Blue Prussian Peas, on the 20th of March and on the 19th of April the plants being about 3 inches high, they were manured with the same series of manures as had been

applied to the Potatoes, namely, Phosphate, Muriate and Sulphate of Ammonia, Sulphate of Soda, Nitrate of Soda, Common Salt, Phosphate and Sulphate of Lime, Sulphate and Muriate of Potash and Sulphate of Magnesia, the twelfth square being left untouched for comparison. The effects produced by these manures were far less marked than had been anticipated, the plants in all the squares grew well, and no luxuriant growth or darker coloured foliage indicated the ammoniacal manure, as had been the case with the Potatoes and Wheat. The only squares in which any difference could be perceived were those to which Common Salt and Nitrate of Soda had been applied, but even in these the superiority above the others was so very slight that it could not be perceived without a careful comparison. About the middle of August the plants ceased to produce pods and began to wither up, they were therefore gathered and the seed threshed out. The following table shews the produce in seed and the weight of dry straw, produced by each square.

	Rod.				Acre.				
	Seed.		Straw.		Seed.			Straw.	
	lbs.	oz.	lbs.	oz.	ton.	cwt.	lbs.	cwt.	lbs.
Nitrate of Soda	11	8½	9	7		16	54	13	57
Phosphate of Ammonia	12	12	8	14½		18	31	12	80
Salt	12	6	10	9		17	76	15	11
Sulphate of Soda	13	0	9	7¼		18	64	13	57
Sulphate of Lime	13	1	9	11¾		18	75	13	101
Sulphate of Magnesia	13	3½	10	0		18	97	14	34
Sulphate of Potash	13	6¾	8	14½		19	19	12	80
Sulphate of Ammonia	13	10	10	4¾		19	52	14	79
Muriate of Potash	15	0½	10	4¾	1	1	51	14	79
Phosphate of Lime	15	3½	9	11¾	1	1	84	13	101
Nothing	15	5½	9	7	1	1	104	16	54
Muriate of Ammonia	15	12½	12	8	1	2	61	17	98

A fourth series of experiments was made with MANGEL WURZEL. Sixteen squares sown with Red Mangel Wurzel on the 12th of May, were manured on the 26th of June; the various substances being applied as a top dressing, sprinkled round the young plants, as was done with the Potatoes, to a distance of about 6 inches on either side of the rows. The plants were 12 inches apart and the distance between the rows was 24 inches. The roots were taken

up on the 23rd of November and weighed. The following were the manures employed and the produce they yielded.

No. 1. Manured with Muriate of Lime at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	4	13	5	98	46	19	88
Tops		11¾		100	7	4	7
Total	5	8¾	6	86	54	3	85

No. 2. Manured with Phosphate of Ammonia at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	11	4	53	35	15	79
Tops		7		59	4	5	1
Total	4	2	5	0	40	0	80

No. 3. Manured with Sulphate of Potash at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	14	4	80	37	14	55
Tops		8½		72	5	2	93
Total	4	6½	5	40	42	17	36

No. 4. Manured with Muriate of Ammonia at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	6	4	13	32	18	101
Tops		10		85	6	1	49
Total	4	0	4	98	39	0	38

No. 5. Manured with Nitrate of Potash, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	12	4	67	36	16	53
Tops		8½		69	4	18	80
Total	4	4½	5	24	41	15	21

No. 6. Manured with Common Salt, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	15	4	94	38	14	97
Tops		8½		72	5	2	93
Total	4	7½	5	54	43	17	78

No. 7. Manured with nothing, left as a standard of comparison. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	2	3	96	30	17	43
Tops		6¼		53	3	16	11
Total	3	8¼	4	37	34	13	54

No. 8. Manured with Muriate of Potash, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	9	4	40	34	16	101
Tops		7¾		68	4	15	77
Total	4	0¾	4	108	39	12	66

No. 9. Manured with Nitrate of Soda, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	8	4	29	34	2	2
Tops		8¼		71	5	2	5
Total	4	0¼	4	99	39	4	7

No. 10. Manured with Sulphate of Magnesia, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	3	3	103	31	7	108
Tops		6¾		58	4	3	6
Total	3	9¾	4	49	35	11	2

No. 11. Manured with Sulphate of Soda, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	4	2	104	32	7	17
Tops		5¾		49	3	10	57
Total	3	9¾	3	41	35	17	74

No. 12. Manured with "Superphosphate of Lime," at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	2	11	3	35	26	10	90
Tops		5½		46	3	8	18
Total	3	0½	3	81	29	18	108

No. 13. Manured with Carbonate of Soda, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	5	3	103	32	13	47
Tops		6¾		57	4	1	30
Total	3	11¾	4	48	36	14	77

No. 14. Manured with Sulphate of Ammonia, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	2	5	2	96	22	17	62
Tops		6		51	3	13	72
Total	2	11	3	35	26	11	22

No. 15. Manured with Phosphate of Soda, at the rate of 6 cwt. per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	2	10	3	23	25	13	19
Tops		5½		48	3	8	62
Total	2	15½	3	71	29	1	81

No. 16. Manured with Rotten Dung, at the rate of 65 cubic yards per acre. The produce was

	Average weight.		Rod.		Acre.		
	lbs.	oz.	cwt.	lbs.	ton.	cwt.	lbs.
Roots	3	7	4	26	33	16	101
Tops		8		68	4	15	65
Total	3	15	4	94	38	12	54

The following table shews the increase of produce caused by each manure, calculated per acre.

	Roots:						Tops.						Roots and Tops.					
	Whole.			Increase.			Whole.			Increase.			Whole.			Increase.		
	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.	ton.	cwt.	lbs.
Sulphate of Ammonia	22	17	62	..	..	..	3	13	72	..	..	..	26	11	22	..	..	..
Phosphate of Soda	25	13	19	..	..	..	3	8	62	..	..	..	29	1	81	..	..	..
Superphosphate of Lime	26	10	90	..	..	..	3	8	18	..	..	..	29	18	108	..	..	..
No Manure . .	30	17	43	..	..	..	3	16	11	..	..	..	34	13	54	..	..	..
Sulphate of Magnesia	31	7	108	..	10	65	4	3	6	..	6	107	35	11	2	..	17	60
Sulphate of Soda .	32	7	17	1	9	86	3	10	57	..	..	..	35	17	74	1	4	20
Carbonate of Soda .	32	13	47	1	16	4	4	1	30	..	4	19	36	14	77	2	0	23
Muriate of Ammonia	32	18	101	2	1	58	6	1	49	2	5	38	39	0	38	4	6	96
Rotten Dung .	33	16	101	2	19	58	4	15	65	..	19	54	38	12	54	3	19	0
Nitrate of Soda .	34	2	2	3	4	71	5	2	5	1	5	105	39	4	7	4	10	65
Muriate of Potash .	34	16	101	3	19	58	4	15	77	..	19	66	39	12	66	4	19	12
Phosphate of Ammonia	35	15	79	4	18	36	4	5	1	..	8	102	40	0	80	5	7	26
Nitrate of Potash .	36	16	53	5	19	10	4	18	80	1	2	69	41	15	21	7	1	79
Sulphate of Potash .	37	14	55	6	17	12	5	2	93	1	6	82	42	17	36	7	3	94
Common Salt .	38	14	97	7	18	54	5	2	93	1	6	82	43	17	78	9	5	24
Muriate of Lime .	46	19	88	16	2	45	7	4	7	3	7	108	54	3	85	19	10	41

There are several points worthy of notice in these experiments, amongst which is the effect of Muriate of Lime. In nearly all the experiments which have been made at the Gardens, marked effects have been produced by manures containing Muriatic acid; hence it was reasonable to conclude beforehand that the Muriate of Lime would prove a good manure. Other considerations gave it a still higher interest; from previous experiments it had been ascertained that a very small quantity of Muriate of Lime in a soil, exerted, in consequence of its hygrometric properties, powerful influence on the retentive power of the soil for moisture. It was, however, apprehended that the presence of any quantity of the salt, even though small, might prove injurious to vegetation. The experiments above described shew that this is not the case; the quantity employed was considerable, and so far from doing any harm, it on the contrary produced a very excellent effect.

The experiments on the hygrometric powers of soils, just referred to, were part of an extensive series, undertaken with a view of ascertaining what influence saline manures exert on the retention of moisture. Weighed quantities of natural and artificial soils of various natures were moistened, some with pure water, and others with water holding in solution minute quantities of different saline substances; the soils were carefully weighed from day to day, and the daily loss of water, subtracted from the original quantity of moisture which the soils contained, shewed the relative retentive power of the soil under examination. The following short table shews the result of one of those experiments in which twenty-five portions of fine siliceous sand weighing 2000 grains each, were each moistened with 500 grains of pure water, and weighed every day. To the first five portions nothing but the water was added, the next five received in addition one grain of Muriate of Lime, the next five two grains of that salt, the next five, five grains, and the remainder ten grains of the Muriate.

The mean of each five weighings, alone is given; the numbers shew the weight of water retained by each portion during the experiment.

	Water only.	One Grain Muriate of Lime.	Two Grains Muriate of Lime.	Five Grains Muriate of Lime.	Ten Grains Muriate of Lime.
1st day .	500	500	500	500	500
2d Do. . .	444	449	453	457	463
3d Do. .	392	403	408	412	416
4th Do. . .	322	344	352	356	361
5th Do. .	266	293	305	312	317
6th Do. . .	230	261	273	280	286
7th Do. .	188	223	236	243	249
8th Do. . .	132	176	189	197	206
9th Do. .	80	129	145	154	163
10th Do. . .	50	93	110	121	134
11th Do. .	26	68	85	98	114
12th Do. . .	13	40	57	71	90
13th Do. .	8	26	40	56	77
14th Do. . .	2	14	25	39	60
15th Do. .	2	9	18	31	52
16th Do. . .	2	5	12	24	44

In the experiment on Mangel Wurzel, it is remarkable that no effect appeared to be produced by the Sulphate of Ammonia, or by the Super-phosphate of Lime; two manures which had been expected to produce the most marked effects. When the manures were applied, it was observed that the squares Nos. 12 and 14, looked rather poorer than the others; the young plants were smaller, and less flourishing; it was for this reason that the two manures supposed to be the most powerful were applied to them, but the plants did not improve, and remained inferior in size and appearance to the last. It is proper to state this, or otherwise the experiment might appear unfavourable to the use of those manures, which would certainly be an incorrect conclusion.*

* The value of these substances, as manures, is every day becoming more evident. The Superphosphate of Lime in particular, is producing excellent effects. At the time when the above-described experiments on Mangel Wurzel were made at the Gardens, my friend, Mr. H. Aglionby, M.P. made others with green round Turnips, on very poor soil, on which the superphosphate produced a larger crop than any other manure. In these experiments, Sulphate of Ammonia, *drilled in under the seed*, failed entirely; on very chalky soil the whole crop was destroyed, and on clayey soil it was evidently greatly injured, though not to the same extent as on chalk. This salt appears to be decidedly best as a top dressing, either mixed with mould or road drift.

As has already been stated, the series of practical experiments in these crops were undertaken with a chemical object in view; it is almost unnecessary to observe, that the relative quantity of produce obtained by each manure, was a matter of comparatively secondary importance; the main object was to connect changes in chemical composition, or quality, with the action and absorption of inorganic manures. In attaining these objects, the richness or variable composition of the soil, exerts little influence, though in judging of the relative practical effects of the manures employed, it causes such irregularities and discrepancies, as to take from the results all pretensions to rigid accuracy in that respect. Very marked differences were produced in the plants experimented on, by the salts applied; and it now remains to investigate the quality and nature of the substances absorbed by the different crops thus manured. The result of that investigation will be the subject of a future communication to the Society.

38, *Bedford Row,*
Jan. 10, 1844.

IV. *The result of some Experiments in the Garden of the Society on the action of Fertilizing Agents upon the Lawn.*

(Communicated by the Garden Committee.)

Like all places, which have been long cultivated, the Garden of the Horticultural Society is by no means well suited to experiments with manures. Nevertheless it has appeared desirable to employ it for such ends, *quantum valet,* and accordingly, among other things, attempts have been made to ascertain the effects of various manuring agents upon the grass of lawns. The results of these experiments are now detailed.

The lawn in the Society's Garden was the scene of operations, and the experiments were necessarily brought to a close in the beginning of May, before the grass could run up into hay; so that the results about to be mentioned do not express the quantity of produce per acre with reference to a hay crop, but merely the relative productiveness of the ground under equal circumstances.

The notes upon them were made at four different times during the season, first in November, shortly after the application of the manures; secondly, in the beginning of February; thirdly, in the beginning of April, and fourthly, on the day when the grass was cut and weighed. The printed remarks are the substance of all such notes, but more particularly of those made at the time when it was cut.

Each experiment occupied one rod of ground, and great care was taken that the soil and lawn should be as nearly as possible the same in each experiment. A part of the trials was made in the months of October and November 1842, the remainder in March 1843, with a view to a determination of the difference which season makes in the application of such substances. The following table shews with what success.

No.	Date of Application.	Date of cutting the grass.	Substances used.	Quantity per acre.	Produce per acre green.	Produce per acre dry.	Remarks.
	1842.	1843.			T. Cwt. lbs.	T. Cwt. lbs.	
1	Oct. 21.	May 4.	Woolwich Humus.	2 tons.	2 18 64	0 8 64	No perceptible difference between this square and the ordinary grass.
2	Ditto.	Ditto.	Soot.	2 cwt.	2 18 64	0 8 64	Slightly greener than the ordinary grass.
3	Ditto.	Ditto.	Nitrate of Soda.	1 cwt.	3 8 64	0 11 48	Rather greener and longer, but no very perceptible difference.
4	Ditto.	Ditto.	Ditto.	2 cwt.	3 17 16	0 15 80	Like the last, but slightly greener.
5	Ditto.	Ditto.	Nitrate of Potash.	1 cwt.	3 8 64	0 11 50	Very slightly greener than the common grass.
6	Ditto.	Ditto.	Ditto.	2 cwt.	4 12 96	0 15 80	Greener and much stronger than the last.
7	Ditto.	Ditto.	Sulphate of Soda.	2 cwt.	3 11 48	0 11 50	No perceptible difference between this and the ordinary grass in colour, but rather thicker and longer.
8	Ditto.	Ditto.	Gas water.	320 gall.	6 8 64	1 1 50	Quite burnt and brown in 48 hours after application and to all appearance dead, but the grass began to recover in 10 days, and in a month became quite green. The white clover was destroyed.
9	Ditto.	Ditto.	Ditto.	640 gall.	6 7 18	1 4 34	Much burnt like the last, and in less time, the square began to recover in about 14 days, but part of the grass was quite killed. That which recovered grew much stronger than any in the preceding square, the clover was entirely destroyed.
10	Ditto.	Ditto.	Gas Lime.	1 ton.	4 8 64	0 15 80	Slightly greener than the common grass but rather thicker.
11	Ditto.	Ditto.	Ditto.	2 tons.	3 4 32	0 12 98	Like the last; slightly greener but rather slenderer than the common grass.
12	Ditto.	Ditto.	Sulphate of Iron.	25 lbs.	2 0 0	0 7 16	No difference in colour, but rather slenderer and thinner than the ordinary grass.
13	Ditto.	Ditto.	Ditto.	50 lbs.	2 0 0	0 8 64	Like the preceding in colour, but stiffer in appearance.
14	Ditto.	Ditto.	Ditto.	100 lbs.	2 12 96	0 12 96	Like the preceding in colour, but rather stronger and a little longer.
15	Ditto.	Ditto.	Muriate of Lime.	2 cwt.	2 10 0	0 7 16	Rather injurious at first, afterwards no visible difference between this and the ordinary grass.
16	Ditto.	Ditto.	Charcoal dust.	2 cwt.	3 0 0	0 7 16	No perceptible difference between this and the ordinary grass.

No.	Date of Application.	Date of cutting the grass.	Substances used.	Quantity per acre.	Produce per acre green.	Produce per acre dry.	Remarks.
	1842.	1843.			T. Cwt. lbs.	T. Cwt. lbs.	
17	Oct. 21.	May 4.	Chloride of Lime.	1 cwt.	4 14 32	0 14 32	Partially burnt in a week after application, and the burning seemed to injure the roots as well as the tops. After the grass recovered, there was no perceptible difference between it and the common grass, but the clover grew remarkably strong in this square the following spring.
18	Ditto.	Ditto.	Ditto.	2 cwt.	3 1 48	0 8 6	More burnt than the last, and the grass much injured. Clover strong and abundant in the spring.
19	Ditto.	Ditto.	Sulphate of Copper.	25 lbs.	2 1 48	0 5 80	No perceptible effect on the grass, no annuals or weeds left alive, but the moss not injured.
20	Ditto.	Ditto.	Ditto.	50 lbs.	2 1 80	0 5 80	Like the last.
21	Ditto.	Ditto.	Ditto.	100 lbs.	2 10 0	0 7 16	Like the last.
22	Ditto.	Ditto.	Daniel's Manure.	2 cwt. 37 lbs. or 80 gallons.	2 5 80	0 7 18	No effect.
23	Ditto.	Ditto.	Gypsum.	320 lbs.	2 7 16	0 7 16	No effect.
24	Ditto.	Ditto.	Nothing.		2 14 32	0 8 64	
25	Ditto.	Ditto.	Gypsum.	640 lbs.	2 2 96	0 5 82	No perceptible difference in colour but the grass appeared slenderer than in either of the two preceding squares.
26	Ditto.	Ditto.	Gypsum and Gas water.	320 lbs. 160 gall.	2 17 16	0 11 0	Very much burnt in 48 hours after application; began to recover in 10 days, became very green and long, but not so strong or so fine as the next square.
27	Ditto.	Ditto.	Ditto.	640 lbs. mixed with 320 gallons.	5 14 32	1 2 96	Like the preceding very much burnt; much longer in recovering; it afterwards grew very strong and green. Some of the grass in this square was killed, but the remainder soon covered the place of that which was destroyed.
28	Ditto.	Ditto.	Guano.	2 cwt.	2 1 48	0 8 64	Very slightly but perceptibly greener than the ordinary grass.
29	Oct. 25.	May 9.	Gas water fixed with Sulphuric acid.	320 gall. 20 lbs.	6 2 98	1 4 32	This only slightly marked the grass, and did not destroy the top. It became very green in a much shorter time, and stronger. Daisies and all annual weeds and moss were destroyed, and the clover became weak and thin.
30	Ditto.	Ditto.	Gas water fixed with Sulphate of Iron.	320 gall. 20 lbs.	5 8 66	1 0 0	Like the preceding in colour and other respects, except that it is not quite so strong; little or no clover appeared in this square.
31	Ditto.	Ditto.	Gas water and sulphate of copper.	320 gall. 20 lbs.	5 8 64	0 18 64	Not nearly so fine as the two preceding squares, but very green, with a large quantity of clover; but no weeds.

No.	Date of Application.	Date of cutting the grass.	Substances used.	Quantity per acre.	Produce per acre green.	Produce per acre dry.	Remarks.
	1842.	1843.			T. Cwt. lbs.	T. Cwt. lbs.	
32	Oct. 25.	May 9.	Gas water and Chloride of Lime.	320 gall. 80 lbs.	5 2 96	1 0 0	Stronger and thicker than the last, but not so long; in other respects the same; no clover.
33	Ditto.	Ditto.	Corrosive Sublimate.	20 gall. of the saturated solution.	2 4 34	0 7 16	No difference between this and the ordinary grass; certainly not injurious; worms abundant in this square.
34	Ditto.	Ditto.	Wood Ashes	4 cwt.	1 17 16	0 4 32	Grass very thin.
35	Ditto.	Ditto.	Gypsum.	2 cwt.	1 4 32	0 2 98	Grass very thin.
36	Ditto.	Ditto.	Ditto.	4 cwt.	1 18 64	0 4 32	The grass a little longer, but nearly as in the preceding square; rather yellow.
37	Nov. 7.	Ditto.	Sulphur.	cwt. lbs. 2 96	1 14 32	0 4 32	Rather yellow and stunted.
38	Ditto.	Ditto.	Gas liquor. Water.	240 gall. 240 gall.	3 14 32	0 12 98	Very green and fine with a little weak clover.
39	Ditto.	Ditto.	Gas liquor. Water.	200 gall. 280 gall.	2 5 82	0 8 64	Less robust and green than the preceding.
40	Ditto.	Ditto.	Gas liquor. Water.	160 gall. 320 gall.	2 2 96	0 7 16	Less strong and green than the last.
41	Ditto.	Ditto.	Gas liquor. Water.	120 gall. 360 gall.	2 1 17	0 7 0	Like the last.
42	Ditto.	Ditto.	Gas liquor. Water.	80 gall. 400 gall.	1 17 16	0 4 34	Very slight difference between this and the ordinary grass; a little greener.
43	Ditto.	Ditto.	Gas liquor. Water.	40 gall. 440 gall.	1 2 96	0 2 98	Hardly any difference between this and the ordinary grass; slightly greener.
44	Ditto.	Ditto.	Bone ash.	7 16	1 5 80	0 2 98	No perceptible difference between these and the ordinary grass. The grass appeared tough when cut.
45	Ditto.	Ditto.	Ditto.	3 64	1 0 2	0 2 96	
46	Ditto.	Ditto.	Sulphuret of Potash.	1 48	1 2 98	0 2 98	
47	Nov. 9.	Ditto.	Strong nitric acid.	10 gall.	3 2 96	0 8 64	Much greener and longer than the ordinary grass.
48	Ditto.	Ditto.	Strong muriatic acid.	10 gall.	3 0 0	0 8 64	Longer but not greener than the ordinary grass.
49	Ditto.	Ditto.	Nitro-muriatic acid.	10 gall.	2 14 32	0 7 16	No visible difference.
50	Ditto.	Ditto.	Pearlash.	3 ct. 4 lb.	1 17 6	0 4 34	Rather injurious; burnt the grass at first.
51	Ditto.	Ditto.	Grass cuttings rotted with gas water.	4 tons.	1 8 64	0 2 98	Strong and green in January; no perceptible difference in April. Probably checked by the cold spring.
52	Ditto.	Ditto.	Urate.	1 ton.	1 17 16	0 4 32	No difference between this and the common grass.
53	Ditto.	Ditto.	Chatwin's artificial manure No. 3.	1 ton.	1 15 80	0 4 34	Very green and strong in January, but no difference between it and the ordinary grass in April. See No. 51.
54	Ditto.	Ditto.	Woolwich Humus.	1 ton.	2 10 0	0 7 18	Slightly greener in January and thicker but in April hardly different in colour from the ordinary grass. See No. 51.
55	Ditto.	Ditto.	Lance's Carbon.	1 ton.	1 15 80	0 4 32	No effect. The grass appeared tough when cut.

No.	Date of Application.	Date of cutting the grass.	Substances used.	Quantity per acre.	Produce per acre green.	Produce per acre dry.	Remarks.
	1842.	1843.			T. Cwt. lbs.	T. Cwt. lbs.	
56	Nov. 9.	May 9.	Bone dust	1 ton.	1 15 80	0 5 80	Slightly stronger, but not greener.
57	Ditto.	Ditto.	Clark's Aimatic compost	1 ton.	1 4 34	0 2 98	Hardly so strong as the ordinary grass, but a little greener in January.
58	Ditto.	Ditto.	Dutch manure or Black powder.	2 cwt.	2 7 16	0 7 16	Thicker but not greener than the common grass.
59	Ditto.	Ditto.	Sulphate of Soda.	4 cwt.	1 12 96	0 4 32	No perceptible difference between this and the ordinary state of the grass.
60	Nov. 23.	Ditto.	Poittevins highly concentrated manure.	12½ cwt.	2 7 16	0 7 16	Slightly greener and thicker than common.
61	Ditto.	Ditto.	Poittevins disinfected manure.	12½ cwt.	1 18 64	0 4 34	No effect.
62	1843. March 1	Ditto.	Nitrate of Soda.	2 cwt.	4 1 48	0 12 96	Very strong and green and the growth very rapid after the first rain.
63	Ditto.	Ditto.	Gas water.	320 gall.	7 11 48	1 2 96	Much burnt in 4 days; quite brown; recovered in 10 days; on the 1st of April very green and strong. This was less injured by the Gas water than when applied in the autumn, but a great part of the grass seems damaged by the cutting, although it was wet weather after it was cut. It eventually recovered. No clover or other plants made their appearance.
64	Ditto.	Ditto.	Gypsum.	320 lbs.	3 1 48	0 10 0	Thicker, but not greener than the ordinary grass.
65	Ditto.	Ditto.	Woolwich Humus.	1 ton.	2 8 64	0 8 64	No perceptible effects.
66	Ditto.	Ditto.	Gas water and Gypsum.	160 gall. 160 lbs.	7 0 2	1 0 2	Not so much burnt as No. 63; yet very brown in 4 days; recovered in 7 days; became very green and strong, and was not injured by the cutting afterwards. The clover was nearly destroyed.
67	Ditto.	Ditto.	Pure Sulphate of Ammonia.	320 lbs.	5 7 18	0 17 18	Partially burnt in 4 days when first applied; recovered in 14 days, and became very strong and green. Grew well after having been cut.
68	Ditto.	Ditto.	Ditto.	640 lbs.	7 1 48	1 0 2	Like the last; partially burnt at first but much injured afterwards when rain came; in some parts the grass was killed; but the remainder soon recovered, and became more vigorous than the preceding. The second growth was very strong and green.
69	March 3.	Ditto.	Gas water Sulphuric acid and Chloride of Lime.	160 gall. 160 lbs. 160 lbs.	3 8 66	0 11 48	Rather greener than the common grass, and longer but not so thick, it began to lose its colour before it was cut.
70	Ditto.	Ditto.	Pure Phosphate of Ammonia.	½ cwt.	4 11 48	0 14 32	Slightly greener than the common grass; but thicker. This became greener the longer it stood, and it produced a finer texture and thicker grass, but not much longer.

It is no doubt true that these, like all other single experiments, are open to objection; and that the conclusions to which they seem to point cannot be regarded as entirely satisfactory. Nevertheless they are by no means undeserving consideration.

In every case the manures in which AMMONIA is a principal ingredient proved by far the most effectual. For example while unmanured ground produced of dry grass per acre, 8 cwt. 64 lbs., and Nitrate of soda, and Nitrate of Potash, at 2 cwt. per acre yielded only 15 cwt. 80 lbs., Ammoniacal manures gave as follows: Gas water fixed with Sulphate of iron, 1 ton; the same mixed with Bleaching powder, 1 ton; Gas water alone, (320 gallons per acre), 1 ton 1 cwt. 50 lbs.; Gas water fixed with Gypsum, 1 ton 2 cwt. 96 lbs.; the same fixed with Sulphuric acid, 1 ton 4 cwt. 32 lbs.; the same alone (640 gallons per acre), 1 ton 4 cwt. 34 lbs.

It also appeared that BLEACHING POWDER (Chloride of lime) produces effects nearly equal to those of Nitrate of soda. For 2 cwt. of soda yielded per acre, 15 cwt. 80 lbs., while 1 cwt. Bleaching powder, produced 14 cwt. 32 lbs. This, however, was only when the Bleaching powder did not exceed 1 cwt. an acre; when the quantity was doubled the produce sank to 8 cwt. per acre; and as the grass was burnt by even the smaller quantity, it is not improbable (and certainly merits enquiry) that half a cwt. per acre would have produced a still better effect.

It was also found that 160 gallons of GAS WATER and 160 lbs. of Gypsum produced, under exactly equal circumstances, as much dry grass as 640 lbs. of pure sulphate of Ammonia; viz., 1 ton and 2 lbs. in both cases; a circumstance of some importance when it is borne in mind that the gas water and gypsum cost scarcely a quarter so much as pure sulphate of Ammonia.

At the suggestion of Mr. Edward Solly, the effect upon grass of certain reputed POISONS was made the subject of enquiry; when it was found that the following substances had rather a beneficial action, viz., strong Nitric acid, at the rate of 10 gallons per acre, strong Muriatic acid at the same rate; and that Corrosive Subli-

mate, at the rate of 20 gallons of the saturated solution per acre, and Nitromuriatic acid, at the rate of 10 gallons per acre, only lowered the produce to the extent of 1 cwt. 48 lbs. per acre.

It has been found that the appearance of the grass when growing, and its quantity when first cut, are no guides to the actual value of a given manure; for it appears that in some instances the quantity of mere water contained in the grass is very considerably greater than in others. For example the DRIED produce obtained from grass treated with Muriate of lime was only 1-7 of the original weight; but Sulphate of soda, Nitrate of potash, Nitrate of soda, in small quantity, and Gas water alone, furnished 1-6; and Nitrate of potash, Nitrate of soda, in larger quantity, Gas water mixed with Sulphuric acid, or with Sulphate of iron, or with bleaching powder, gave 1-5; while the lime used in purifying gas by the moist way yielded 1-3. So that while 1 ton of fresh grass produced by means of *gas lime* would yield *dry* 6 cwt. 74 lbs., 1 ton from Nitrate of potash, Nitrate of soda, in large quantities, Gas water mixed with Sulphuric acid, or with Sulphate of iron, or with Bleaching powder, give but 4 cwt.; 1 ton from Sulphate of Soda, Nitrate of potash, Nitrate of soda in small quantities and Gas water alone, give only 3 cwt. 37 lbs.; while 1 ton from Muriate of lime yields so little as 2 cwt. 96 lbs. or considerably less than half as much as the first.

Among the manures which produced NO EFFECT on this occasion was Woolwich Humus, a substance consisting of ancient decayed vegetable remains found in excavating some docks at Woolwich, Soot, Sulphate of iron, Guano; while Poittevin's manure, Dutch manure, Clarke's Aimatic compost, Lance's Carbon, and Chatwin's artificial manure all diminished the quantity of dry grass more or less. It does not however follow that they are prejudicial, or even useless; because Woolwich humus, which in these experiments was of no value, was found in the Kitchen garden a very useful substance. It is possible that the manner of application, a top dressing, or the season, autumn, were unfavourable to their action.

Note by Mr. E. Solly.

It is, I think necessary to observe, that, notwithstanding all the care that was taken in selecting the ground, the turf which formed the subject of the preceding experiments, varied greatly in quality : each experiment was made it is true on a small space of ground, but as the number of experiments was considerable, the space over which the whole series extended was necessarily large ; and included a considerable variety of turf, hence it is impossible to compare the produce of the different squares with the ordinary unmanured grass of the Lawn, as the quantity of the latter is very variable. The produce of the standard square No. 24, was 8 cwt. 64 lbs. dry hay, whilst that of No. 44 which had been manured with 7 cwt. of Bone ash, was only 2 cwt. 98 lbs. dry hay, which is about the quantity which would have been given by a similar square without any manure at this part of the lawn. In the same way, it may be remarked that the superior produce of the strong mineral acids, Nos. 47, 48 and 49 over that of Bone ash, Nos. 44 and 45, is in part due to the difference naturally existing between the soil and turf where the experiment was made.

The experiments with ammoniacal compounds are amongst the most satisfactory, and in those the increase of produce is so large as to be quite independent of variations in the soil, &c. It is rather unfortunate that the strength of Gas liquor varies very greatly, so that the same quantity at one season of the year frequently contains much more ammonia than at others. The Gas liquor used in these experiments was very strong ; every gallon required about 4670 grains of the strongest Sulphuric acid to neutralise the ammonia, and on evaporation left nearly 20 oz. of crystallised Sulphate of ammonia. The Gas liquor commonly employed is much weaker ; some used in the garden the preceding year, required only about 1600 grains of acid per gallon, and gave 7 oz. of the crystallised salt. The object which I had in the experiments 38 to 43, was to ascertain what quantity of Gas liquor produced the maximum effect

which could be advantageously obtained, or rather what was the largest quantity which could be profitably employed as manure. It is evident that this experiment was not carried out quite far enough as the maximum of produce was not obtained. No. 38 to which 240 gallons of Gas liquor, equal to 300 lbs. of Sulphate of ammonia, was applied, produced a far better crop than No. 39 which received 200 gallons or 250 lbs. of the salt: the increase of grass being in a much greater proportion than the increased quantity and cost of the manure. There appears to be little doubt that in situations where Gas liquor can be had readily, and applied without difficulty, it is preferable to Sulphate of ammonia; but on the other hand, the latter, though rather more expensive, can be spread more easily, and is far less costly in carriage.

V. *Notes made in the Garden of the Horticultural Society upon the rate of growth by plants at different periods of the day.* By the Vice Secretary.

(Communicated by the Garden Committee.)

The great differences that occur in nature between the relation of plants to the atmosphere, at different periods of the day, do not appear to have often suggested the necessity of observing the degree in which vegetation is affected by such circumstances in their rate of growth. And yet we must suppose that the developement of a plant under the influence of a bright sun, or in a damp and clouded atmosphere, in a cool night, or in a chilly morning before sunrise, will be materially dissimilar. It is in very few cases, however, that physiologists have turned their attention to such variations. For this reason, and more especially because the operations of the forcing gardener are very much connected with the enquiry, a series of observations upon the subject was made four times daily, in the Garden of the Society, by Mr. James Donald, during the months of March and April 1843.

The plants selected for Experiment were a Sweet willow (Salix pentandra), a Fig, the Onyx Passionflower, (Passiflora onychina), and a Vine. The place in which the observations were made was a damp curvilinear stove, used for the cultivation of tropical plants; its average temperature being 69°; that is 73° by day and 65° by night. The plants were fastened as they grew, to a lath, on which the amount of lengthening was marked off four times a day, viz. at 6 A.M.; Noon; 6 P.M.; and 11 P.M.

1. Observations on the elongation of the Sweet Willow (Salix pentandra) at different periods of the day and night, in a curvilinear stove—average temperature 69°. (+ = above .40. — = below .05.)

1843.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Total Increase daily.
Mar. 1	6 A.M.	0.00	31° Cloudy	Noon	0.18	35° Cloudy	6 P.M.	0.12	40° Clear	11 P.M.	0.13	33° Clear	0.43
2	—	0.10	23° Ditto	—	0.26	36° Bright sun	—	0.20	42° Fine	—	0.20	33° Cloudy	0.76
3	—	0.25	24° Clear	—	0.26	35° Very ditto	—	0.26	42° Clear	—	0.10	27° Ditto	0.87
4	—	+0.42	30° Cloudy	—	0.31	37° Flying clouds	—	+0.45	41° Ditto	—	0.17	27° Ditto	1.35
5	—	0.19	18° Ditto (rain)	—	+0.40	35° Cloudy	—	0.18	46° Fine	—	0.10	34° Ditto	0.87
6	—	0.10	31° Ditto	—	0.20	39° Ditto	—	0.09	44° Clear	—	0.07	33° Clear	0.46
7	—	0.07	20° Foggy	—	+0.56	34° Ditto	—	0.30	46° Foggy	—	0.12	32° Foggy	1.05
8	—	0.10	24° Ditto	—	0.07	39° Clear	—	0.21	45° Clear	—	0.15	31° Clear	0.53
9	—	0.18	28° Cloudy	—	+0.48	37° Cloudy	—	0.13	38° Cloudy	—	0.10	30° Cloudy	0.89
10	—	0.14	24° Ditto	—	0.20	39° Ditto	—	0.15	44° Ditto	—	0.27	38° Ditto	0.76
11	—	+0.40	28° Ditto	—	0.17	43° Ditto	—	0.11	47° Ditto	—	0.10	41° Very dark	0.78
12	—	0.23	40° Ditto	—	0.13	46° Ditto	—	0.13	50° Ditto	—	0.14	47° Dark	0.63
13	—	0.26	32° Clear	—	+0.43	44° Clear	—	0.20	52° Ditto	—	0.20	45° Very dark	1.09
14	—	0.39	43° Cloudy	—	0.11	51° Fine	—	0.19	56° Ditto	—	0.12	48° Overcast	0.81
15	—	0.15	45° Ditto	—	0.15	51° Cloudy	—	0.25	57° Ditto	—	0.18	49° Dark (rain)	0.73
16	—	0.22	45° Foggy	—	0.16	54° Bright sun	—	0.28	57° Fine	—	0.12	41° Cloudy (do.)	0.78
17	—	0.21	29° Ditto	—	0.11	49° Very bright	—	0.06	64° Ditto	—	—0.05	40° Clear	0.43
18	—	—0.05	31° Ditto	—	0.16	49° Ditto	—	0.23	67° Ditto	—	0.14	46° Ditto	0.58
19	—	0.22	36° Ditto	—	0.22	47° Foggy	—	0.11	55° Foggy	—	0.10	44° Very dark	0.65
20	—	0.19	41° Ditto	—	0.33	51° Bright	—	0.25	63° Cloudy	—	0.15	52° Cloudy (rain)	0.92
21	—	0.34	45° Ditto	—	0.22	52° Overcast	—	0.14	59° Ditto	—	0.11	51° Ditto (do.)	0.81
22	—	0.38	47° Ditto	—	0.23	56° Flying clouds	—	0.15	61° Fine	—	0.13	52° Ditto	0.89
23	—	0.39	46° Cloudy	—	0.12	54° Bright sun	—	0.28	60° Ditto	—	0.15	47° Clear	0.94
24	—	0.31	42° Ditto	—	0.16	56° Fine	—	0.11	64° Ditto	—	0.09	49° Ditto	0.67
25	—	0.11	41° Hazy	—	0.11	48° Ditto	—	0.16	55° Ditto	—	0.10	44° Cloudy	0.48
26	—	0.14	36° Clear	—	0.22	45° Ditto	—	0.24	51° Flying clouds	—	0.12	40° Dark	0.72
27	—	0.10	36° Cloudy	—	0.10	40° Ditto	—	0.10	46° Fine	—	0.10	38° Ditto	0.40
28	—	0.15	38° Ditto	—	0.11	45° Ditto	—	0.23	51° Ditto	—	0.08	33° Ditto	0.57
29	—	0.15	28° Clear	—	0.10	46° Clear	—	0.25	56° Ditto	—	0.10	39° Clear	0.60
30	—	0.10	29° Cloudy	—	0.16	51° Fine	—	0.21	54° Ditto	—	0.20	51° Dark (rain)	0.67
31	—	0.12	43° Ditto	—	0.17	55° Cloudy	—	0.07	58° Clear	—	—0.05	49° Cloudy	0.41
Apr. 1	—	—0.04	46° Ditto	—	0.10	55° Ditto	—	0.17	59° Cloudy	—	0.08	52° Ditto	0.39
2	—	0.15	50° Ditto	—	0.10	56° Fine	—	0.10	59° Ditto	—	0.06	50° Dark	0.41
3	—	0.14	48° Ditto (rain)	—	0.28	57° Cloudy	—	0.13	61° Fine	—	0.06	49° Clear	0.61
4	—	0.10	46° Ditto ditto	—	0.10	54° Clear	—	0.16	57° Ditto	—	0.15	48° Ditto	0.51
5	—	0.16	41° Ditto	—	0.25	52° Cloudy	—	0.10	56° Cloudy	—	0.09	44° Ditto	0.60
6	—	0.10	38° Ditto	—	0.10	52° Ditto	—	0.10	55° Ditto	—	0.10	51° Cloudy	0.40
7	—	0.19	51° Ditto	—	0.06	57° Ditto	—	0.08	62° Clear	—	0.15	50° Ditto	0.48
8	—	0.17	44° Clear	—	0.20	53° Clear	—	0.14	59° Ditto	—	0.15	45° Ditto	0.66
9	—	0.13	39° Cloudy	—	0.14	46° Cloudy	—	0.14	47° Cloudy	—	0.20	38° Ditto	0.61
10	—	0.23	32° Clear	—	0.14	44° Clear	—	0.12	50° Ditto	—	0.09	34° Clear	0.58
11	—	—0.04	26° Ditto	—	0.08	42° Bright sun	—	0.10	49° Fine	—	0.11	31° Ditto	0.33
12	—	0.11	22° Ditto	—	0.07	42° Ditto	—	0.15	48° Ditto	—	0.16	33° Ditto	0.49
13	—	0.26	28° Ditto	—	0.09	42° Ditto	—	0.14	48° Ditto	—	0.12	31° Ditto	0.61
14	—	0.06	24° Overcast	—	0.14	48° Cloudy	—	0.36	54° Cloudy	—	0.13	48° Cloudy	0.69
15	—	0.15	42° Cloudy	—	0.06	55° Ditto	—	0.12	58° Ditto	—	0.12	52° Ditto	0.45
16	—	0.19	47° Clear	—	0.10	56° Clear [sun	—	0.10	63° Clear	—	0.10	51° Clear	0.49
17	—	0.15	42° Ditto	—	0.20	57° Very bright	—	0.16	65° Fine	—	0.06	49° Ditto	0.57
18	—	—0.04	33° Ditto	—	0.07	52° Ditto	—	0.07	67° Ditto	—	0.08	50° Ditto	0.26
19	—	0.07	35° Ditto	—	0.15	52° Bright sun	—	0.09	63° Ditto	—	0.08	48° Ditto	0.39
20	—	0.20	41° Ditto	—	0.13	63° Ditto	—	0.12	70° Ditto	—	0.13	51° Ditto	0.58
21	—	0.21	36° Ditto	—	0.07	57° Ditto	—	0.07	65° Ditto	—	—0.03	50° Cloudy (rain)	0.38
22	—	—0.05	45° Ditto	—	0.16	52° Ditto	—	0.10	59° Ditto	—	0.07	51° Clear	0.38
23	—	0.08	26° Ditto	—	0.10	51° Very bright	—	0.15	60° Ditto	—	0.16	43° Ditto	0.49
24	—	—0.05	28° Foggy	—	0.08	54° Bright sun	—	0.08	60° Ditto	—	0.16	33° Cloudy (rain)	0.37
25	—	0.11	27° Cloudy	—	0.08	47° Fine	—	0.13	56° Ditto	—	0.08	40° Dark	0.40
26	—	0.10	34° Ditto (rain)	—	—0.05	45° Ditto	—	0.08	57° Ditto	—	0.09	40° Ditto (rain)	0.32
27	—	0.11	34° Fine	—	—0.05	49° Ditto	—	0.09	60° Ditto	—	0.09	43° Clear	0.34
28	—	0.06	33° Cloudy (rain)	—	0.14	50° Cloudy	—	0.10	54° Cloudy	—	—0.03	48° Cloudy	0.33
29	—	—0.04	40° Ditto (ditto)	—	—0.05	52° Ditto	—	—0.04	59° Ditto	—	0.08	49° Ditto	0.21
30	—	0.08	43° Ditto	—	0.08	61° Fine	—	0.08	69° Fine	—	0.10	54° Ditto	0.34
May 1	—	0.14	49° Fine	—	0.18	59° Ditto	—	0.12	70° Ditto	—	0.10	54° Clear	0.54
2	—	—0.05	42° Cloudy	—	0.14	61° Ditto	—	0.14	69° Ditto	—	0.15	50° Ditto	0.48
3	—	0.11	40° Clear	—	0.20	54° Bright sun	—	0.15	66° Ditto	—	0.18	50° Ditto	0.64
4	—	0.14	44° Cloudy	—	0.16	60° Ditto	—	0.12	66° Ditto	—	0.20	50° Ditto	0.62
5	—	0.27	45° Clear	—	0.11	60° Clear	—	0.08	63° Cloudy	—	0.09	51° Ditto	0.55
6	—	0.20	42° Hazy (rain)	—	0.14	44° Cloudy	—	0.20	53° Ditto	—	0.18	41° Ditto	0.72
7	—	0.29	32° Clear	—	0.19	52° Ditto	—	0.20	59° Ditto	—	0.20	44° Ditto	0.88
		10.93	= .160 *average.*		11.13	= .163 *average.*		10.42	= .153 *average.*		8.15	= .119 *average.*	40.63

2. Observations on the elongation of the Fig at different periods of the day and night, in a curvilinear stove—average temperature 69°.
(+ = above .15 — = below .05)

1843.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Total Increase Daily.
Mar. 1	6 A.M.	0.00	31° Cloudy	Noon	0.10	35° Cloudy	6 P.M.	+0.15	40° Clear	11 P.M.	0.09	33° Clear	0.34
2	—	0.06	23° Ditto	—	0.10	36° Bright sun	—	0.11	42° Fine	—	0.09	33° Cloudy	0.36
3	—	0.09	24° Clear	—	0.07	35° Very ditto	—	0.06	42° Clear	—	0.06	27° Ditto	0.28
4	—	0.08	30° Cloudy	—	0.13	37° Flying clouds	—	0.12	41° Ditto	—	0.08	27° Ditto	0.41
5	—	0.09	18° Ditto (rain)	—	0.09	35° Cloudy	—	0.14	46° Fine	—	0.12	34° Ditto	0.44
6	—	0.08	31° Ditto	—	0.10	39° Ditto	—	0.14	44° Clear	—	0.10	33° Clear	0.42
7	—	0.08	20° Foggy	—	0.08	34° Ditto	—	0.08	46° Foggy	—	0.10	32° Foggy	0.34
8	—	0.06	24° Ditto	—	0.06	39° Clear	—	0.07	45° Clear	—	0.10	31° Clear	0.29
9	—	0.08	28° Cloudy	—	0.07	37° Cloudy	—	—0.05	38° Cloudy	—	0.08	30° Cloudy	0.28
10	—	0.10	24° Ditto	—	0.06	39° Ditto	—	0.07	44° Ditto	—	0.12	38° Ditto	0.35
11	—	0.09	28° Ditto	—	+0.17	43° Ditto	—	0.06	47° Ditto	—	0.08	41° Very dark	0.40
12	—	0.09	40° Ditto	—	0.09	46° Ditto	—	0.09	50° Ditto	—	0.11	47° Dark	0.38
13	—	0.12	32° Clear	—	0.06	44° Clear	—	0.10	52° Ditto	—	—0.04	45° Very Dark	0.32
14	—	—0.04	43° Cloudy	—	0.08	51° Fine	—	0.12	56° Ditto	—	0.10	48° Overcast	0.34
15	—	0.09	45° Ditto	—	0.09	51° Cloudy	—	0.10	57° Ditto	—	0.06	49° Dark (rain)	0.34
16	—	0.09	45° Foggy	—	+0.17	54° Bright sun	—	0.09	57° Fine	—	0.09	41° Cloudy (do.)	0.44
17	—	0.11	29° Ditto	—	—0.04	49° Very bright	—	—0.04	64° Ditto	—	0.13	40° Clear	0.32
18	—	—0.05	31° Ditto	—	—0.05	49° Ditto	—	—0.04	67° Ditto	—	0.06	46° Ditto	0.20
19	—	0.10	36° Ditto	—	0.09	47° Foggy	—	0.09	55° Foggy	—	0.07	44° Very dark	0.35
20	—	0.08	41° Ditto	—	—0.04	51° Bright	—	0.06	63° Cloudy	—	0.07	52° Cloudy (rain)	0.25
21	—	0.07	45° Ditto	—	0.09	52° Overcast	—	0.06	59° Ditto	—	0.07	51° Ditto (do.)	0.29
22	—	0.06	47° Ditto	—	—0.05	56° Flying clouds	—	0.07	61° Fine	—	0.06	52° Ditto	0.24
23	—	—0.04	46° Cloudy	—	—0.00	54° Bright sun	—	—0.04	60° Ditto	—	—0.04	47° Clear	0.12
24	—	—0.03	42° Ditto	—	—0.03	56° Fine	—	—0.03	64° Ditto	—	—0.03	49° Ditto	0.12
25	—	0.06	41° Hazy	—	—0.04	48° Ditto	—	0.07	55° Ditto	—	—0.02	44° Cloudy	0.19
26	—	0.10	36° Clear	—	0.06	45° Ditto	—	0.06	51° Flying clouds	—	—0.04	40° Dark	0.26
27	—	—0.04	36° Cloudy	—	0.06	40° Ditto	—	0.06	46° Fine	—	—0.04	38° Ditto	0.20
28	—	0.07	38° Ditto	—	—0.05	45° Ditto	—	—0.05	51° Ditto	—	0.08	33° Ditto	0.25
29	—	—0.05	28° Clear	—	—0.04	46° Clear	—	—0.05	56° Ditto	—	—0.05	39° Clear	0.19
30	—	0.07	29° Cloudy	—	0.07	51° Fine	—	0.06	54° Ditto	—	—0.05	51° Dark (rain)	0.25
31	—	0.14	43° Ditto	—	+0.15	55° Cloudy	—	0.06	58° Clear	—	0.12	49° Cloudy	0.47
Apr 1	—	+0.19	46° Ditto	—	0.12	55° Ditto (rain)	—	0.10	59° Cloudy	—	0.10	52° Ditto	0.51
2	—	0.08	50° Ditto	—	0.06	56° Fine	—	0.06	59° Ditto	—	0.06	50° Dark	0.26
3	—	0.08	48° Ditto (rain)	—	—0.05	57° Cloudy	—	0.07	61° Fine	—	0.08	49° Clear	0.28
4	—	0.12	46° Ditto ditto	—	0.10	54° Clear	—	0.09	57° Ditto	—	0.14	48° Ditto	0.45
5	—	0.12	41° Ditto	—	0.07	52° Cloudy	—	0.07	56° Cloudy	—	0.07	44° Ditto	0.33
6	—	0.06	38° Ditto	—	0.06	52° Ditto	—	0.07	55° Ditto	—	0.06	51° Cloudy	0.25
7	—	0.06	51° Ditto	—	0.06	57° Ditto	—	0.07	62° Clear	—	0.07	50° Ditto	0.26
8	—	0.07	44° Clear	—	0.14	53° Clear	—	0.14	59° Ditto	—	0.06	45° Ditto	0.41
9	—	0.07	39° Cloudy	—	—0.05	46° Cloudy	—	—0.05	47° Cloudy	—	—0.05	38° Ditto	0.22
10	—	0.06	32° Clear	—	—0.03	44° Clear	—	—0.03	50° Ditto	—	—0.04	34° Clear	0.16
11	—	—0.03	26° Ditto	—	0.05	42° Bright sun	—	—0.05	49° Fine	—	0.06	31° Ditto	0.19
12	—	—0.04	22° Ditto	—	—0.04	42° Ditto	—	0.06	48° Ditto	—	—0.05	33° Ditto	0.19
13	—	—0.04	28° Ditto	—	0.06	42° Ditto	—	—0.03	48° Ditto	—	—0.05	31° Ditto	0.18
14	—	—0.05	24° Overcast	—	0.09	48° Cloudy	—	0.09	51° Cloudy	—	0.12	48° Cloudy	0.35
15	—	0.07	42° Cloudy	—	—0.05	55° Ditto	—	—0.05	58° Ditto	—	—0.05	52° Ditto	0.22
16	—	0.08	47° Clear	—	0.08	56° Clear [sun	—	0.07	63° Clear	—	0.14	51° Clear	0.37
17	—	0.11	42° Ditto	—	0.11	57° Very bright	—	0.12	65° Fine	—	0.12	49° Ditto	0.46
18	—	0.12	33° Ditto	—	+0.22	57° Ditto	—	0.21	67° Ditto	—	—0.03	50° Ditto	0.58
19	—	0.11	35° Ditto	—	0.11	52° Bright sun	—	+0.16	63° Ditto	—	+0.15	48° Ditto	0.53
20	—	+0.15	41° Ditto	—	+0.15	63° Ditto	—	0.12	70° Ditto	—	0.12	51° Ditto	0.54
21	—	0.11	36° Ditto	—	0.06	57° Ditto	—	0.12	65° Ditto	—	0.09	50° Cloudy (rain)	0.38
22	—	0.09	45° Ditto	—	0.09	52° Ditto	—	0.13	59° Ditto	—	0.10	51° Clear	0.41
23	—	0.09	26° Ditto	—	0.06	51° Very bright	—	0.10	60° Ditto	—	0.06	43° Ditto	0.31
24	—	0.07	28° Foggy	—	0.07	54° Bright sun	—	0.09	60° Ditto	—	0.08	33° Cloudy (rain)	0.31
25	—	0.11	27° Cloudy	—	0.14	47° Fine	—	0.11	56° Ditto	—	—0.03	40° Dark	0.39
26	—	+0.22	34° Ditto (rain)	—	0.13	45° Ditto	—	0.13	57° Ditto	—	—0.04	40° Ditto (rain)	0.52
27	—	+0.19	34° Fine	—	+0.15	49° Ditto	—	+0.15	60° Ditto	—	—0.05	43° Clear	0.54
28	—	+0.20	33° Cloudy (rain)	—	0.10	50° Cloudy	—	0.11	54° Cloudy	—	0.08	48° Cloudy	0.49
		5.10	= .089 *average.*		4.88	= .085 *average.*		5.04	= .088 *average.*		4.50	= .078 *average.*	19.52

3. Observations on the elongation of the Onyx Passionflower (Passiflora onychina) at different periods of the day and night, in a curvilinear Stove – average temperature 69°. (+ = above .70 — = below .10)

1843.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Total [illegible]
Mar. 1	6 A.M.	0.00	31° Cloudy	Noon	0.12	35° Cloudy	6 P.M.	0.15	40° Clear	11 P.M.	0.13	33° Clear	[illegible]
2	—	0.24	23° Ditto	—	—0.08	36° Bright sun	—	0.18	42° Fine	—	0.18	33° Cloudy	[illegible]
3	—	0.54	24° Clear	—	—0.05	35° Very ditto	—	0.23	42° Clear	—	0.31	27° Ditto	[illegible]
4	—	0.20	30° Cloudy	—	0.11	37° Flying clouds	—	0.60	41° Ditto	—	—0.05	27° Ditto	[illegible]
5	—	0.14	18° Ditto (rain)	—	—0.03	35° Cloudy	—	0.20	46° Fine	—	0.47	34° Ditto	[illegible]
6	—	0.17	31° Cloudy	—	0.17	39° Ditto	—	0.22	44° Clear	—	0.21	33° Clear	[illegible]
7	—	0.41	20° Foggy	—	0.24	34° Ditto	—	0.14	46° Foggy	—	0.21	32° Foggy	[illegible]
8	—	0.18	24° Ditto	—	0.13	39° Clear	—	0.35	45° Clear	—	0.17	31° Clear	[illegible]
9	—	0.28	28° Cloudy	—	0.26	37° Cloudy	—	0.16	38° Cloudy	—	0.45	30° Cloudy	[illegible]
10	—	0.28	24° Ditto	—	—0.09	39° Ditto	—	0.33	44° Ditto	—	0.19	38° Ditto	[illegible]
11	—	0.26	28° Ditto	—	—0.08	43° Ditto	—	0.41	47° Ditto	—	0.33	41° Very dark	[illegible]
12	—	0.46	40° Ditto	—	0.27	46° Ditto	—	0.49	50° Ditto	—	0.40	47° Dark	[illegible]
13	—	0.60	32° Clear	—	0.19	44° Clear	—	0.50	52° Ditto	—	0.55	45° Very dark	[illegible]
14	—	0.55	47° Cloudy	—	0.36	51° Fine	—	0.31	56° Ditto	—	0.26	48° Overcast	[illegible]
15	—	0.56	45° Ditto	—	0.32	51° Cloudy	—	0.41	57° Ditto	—	0.25	49° Dark (rain)	[illegible]
16	—	0.67	45° Foggy	—	0.29	54° Bright sun	—	0.63	57° Fine	—	0.13	41° Cloudy ditto	[illegible]
17	—	0.20	29° Ditto	—	—0.05	49° Very ditto	—	0.31	64° Ditto	—	0.52	40° Clear	[illegible]
18	—	0.21	31° Ditto	—	—0.05	49° Ditto	—	0.14	67° Ditto	—	0.59	46° Ditto	[illegible]
19	—	0.25	36° Ditto	—	0.48	47° Foggy	—	0.53	55° Foggy	—	—0.09	44° Very dark	[illegible]
20	—	+0.70	41° Ditto	—	0.27	51° Bright	—	0.48	63° Cloudy	—	0.48	52° Cloudy (rain)	[illegible]
21	—	[illegible]	45° Ditto	—	0.33	52° Overcast	—	0.46	59° Ditto	—	0.30	51° Ditto ditto	[illegible]
22	—	0.26	47° Ditto	—	0.16	56° Flying clouds	—	+0.76	61° Fine	—	0.33	52° Cloudy	[illegible]
23	—	0.40	46° Cloudy	—	0.50	54° Bright sun	—	0.29	60° Ditto	—	0.29	47° Clear	[illegible]
24	—	0.34	42° Ditto	—	0.24	56° Fine	—	0.50	64° Ditto	—	0.35	49° Ditto	[illegible]
25	—	0.60	41° Hazy	—	—0.03	48° Ditto	—	0.32	55° Ditto	—	—0.08	44° Cloudy	[illegible]
26	—	0.55	36° Clear	—	—0.08	45° Ditto	—	0.11	51° Flying clouds	—	0.12	40° Dark	[illegible]
27	—	0.14	36° Cloudy	—	0.11	40° Ditto	—	0.28	46° Fine	—	0.21	38° Ditto	[illegible]
28	—	0.21	38° Ditto	—	—0.08	45° Ditto	—	0.55	51° Ditto	—	0.24	33° Ditto	[illegible]
29	—	0.22	28° Clear	—	0.16	46° Clear	—	0.25	56° Ditto	—	0.25	39° Clear	[illegible]
30	—	0.62	29° Cloudy	—	0.20	51° Fine	—	+0.79	54° Ditto	—	0.34	51° Dark (rain)	[illegible]
31	—	0.49	43° Ditto	—	0.47	55° Cloudy	—	0.32	58° Clear	—	0.27	49° Cloudy	[illegible]
Apr. 1	—	0.59	46° Ditto	—	0.39	55° Ditto (rain)	—	0.31	59° Cloudy	—	0.33	52° Ditto	[illegible]
2	—	0.31	50° Ditto	—	0.56	56° Fine	—	0.50	59° Ditto	—	0.25	50° Dark	[illegible]
3	—	0.65	48° Ditto (rain)	—	0.36	57° Cloudy	—	0.50	61° Fine	—	0.30	49° Clear	[illegible]
4	—	0.47	45° Ditto ditto	—	0.10	54° Clear	—	0.50	57° Ditto	—	0.25	48° Ditto	[illegible]
5	—	0.55	41° Ditto	—	0.42	52° Cloudy	—	+0.72	56° Cloudy	—	0.25	44° Ditto	[illegible]
6	—	0.27	38° Ditto	—	0.31	52° Ditto	—	0.26	55° Ditto	—	0.20	51° Cloudy	[illegible]
7	—	0.24	41° Ditto	—	—0.07	57° Ditto	—	0.17	62° Clear	—	0.10	50° Ditto	[illegible]
8	—	0.40	44° Clear	—	0.13	53° Clear	—	0.29	59° Ditto	—	0.26	45° Ditto	[illegible]
9	—	0.13	39° Cloudy	—	0.34	46° Cloudy	—	0.47	47° Cloudy	—	0.27	38° Ditto	[illegible]
10	—	0.54	32° Clear	—	0.34	44° Clear	—	0.20	50° Ditto	—	0.34	34° Clear	[illegible]
11	—	0.36	26° Ditto	—	0.19	42° Bright sun	—	0.42	49° Fine	—	0.39	31° Ditto	[illegible]
12	—	0.20	22° Ditto	—	0.10	42° Ditto	—	0.67	48° Ditto	—	0.23	33° Ditto	[illegible]
13	—	0.52	28° Ditto	—	0.23	42° Ditto	—	0.50	48° Ditto	—	0.20	31° Ditto	[illegible]
14	—	0.16	24° Overcast	—	—0.06	48° Cloudy	—	+0.82	54° Cloudy	—	0.11	48° Cloudy	[illegible]
15	—	0.20	42° Cloudy	—	0.34	55° Ditto	—	0.24	58° Ditto	—	0.22	52° Ditto	[illegible]
16	—	0.39	47° Clear	—	0.60	56° Clear [sun	—	0.60	63° Clear	—	0.60	51° Clear	[illegible]
17	—	0.41	42° Ditto	—	0.26	57° Very bright	—	0.60	65° Fine	—	0.45	49° Ditto	[illegible]
18	—	0.22	33° Ditto	—	0.22	57° Ditto	—	0.65	67° Ditto	—	0.58	50° Ditto	[illegible]
19	—	0.28	38° Ditto	—	0.19	52° Bright sun	—	0.26	63° Ditto	—	0.16	48° Ditto	[illegible]
20	—	0.67	41° Ditto	—	0.23	63° Very ditto	—	0.52	70° Ditto	—	0.23	51° Ditto	[illegible]
21	—	0.60	36° Ditto	—	0.24	57° Bright sun	—	0.24	65° Ditto	—	0.42	50° Cloudy (rain)	[illegible]
22	—	[illegible]	[illegible] Ditto	—	0.27	52° Ditto	—	0.56	59° Ditto	—	0.28	51° Clear	[illegible]
23	—	0.38	29° Ditto	—	0.50	51° Very bright	—	0.39	60° Ditto	—	0.34	43° Ditto	[illegible]
24	—	0.13	28° Foggy	—	0.23	54° Bright sun	—	0.50	60° Ditto	—	0.44	33° Cloudy (rain)	[illegible]
25	—	0.29	27° Cloudy	—	0.73	47° Fine	—	0.15	56° Ditto	—	0.15	40° Dark	[illegible]
		[illegible]	= .359 average		13.41	= .239 average.		22.44	= .400 average.		16.10	= .289 average.	

4. Observations on the elongation of the Vine at different periods of the day and night, in a curvilinear Stove—average temperature 69°.
(+ = above .70 — = below .10)

1843	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Time.	Inches.	External Temperature and Remarks.	Total increase daily.
Mar 1	6 A.M.	0.60	31° Cloudy	Noon	0.20	35° Cloudy	6 P.M.	0.34	40° Clear	11 P.M.	0.12	33° Clear	0.66
2	—	0.32	23° Ditto	—	0.55	36° Bright sun	—	0.31	42° Fine	—	0.31	33° Cloudy	1.49
3	—	0.37	24° Clear	—	0.62	35° Very bright	—	0.54	42° Clear	—	0.28	27° Ditto	1.81
4	—	0.52	30° Cloudy	—	+0.74	37° Flying clouds	—	0.50	41° Ditto	—	0.14	27° Ditto	1.90
5	—	0.22	18° Ditto (rain)	—	0.38	35° Cloudy	—	0.38	46° Fine	—	0.28	34° Ditto	1.26
6	—	0.66	31° Ditto	—	0.52	39° Ditto	—	0.38	44° Clear	—	0.25	33° Clear	1.81
7	—	0.49	20° Foggy	—	0.42	34° Ditto	—	0.39	46° Foggy	—	0.40	32° Foggy	1.70
8	—	0.33	24° Ditto	—	0.66	39° Clear	—	0.54	45° Clear	—	0.46	31° Clear	1.99
9	—	+0.70	28° Cloudy	—	0.47	37° Cloudy	—	0.43	38° Cloudy	—	0.47	30° Cloudy	2.07
10	—	0.50	24° Ditto	—	0.54	39° Ditto	—	0.47	44° Ditto	—	0.23	38° Ditto	1.74
11	—	0.54	28° Ditto	—	0.36	43° Ditto	—	0.35	47° Ditto	—	0.12	41° Very dark	1.37
12	—	+0.85	40° Ditto	—	0.58	46° Ditto	—	0.66	50° Ditto	—	0.32	47° Dark	2.41
13	—	+0.78	32° Clear	—	0.51	44° Clear	—	0.51	52° Ditto	—	0.43	45° Very dark	2.23
14	—	0.54	43° Cloudy	—	+0.77	51° Fine	—	0.47	56° Ditto	—	0.15	48° Overcast	1.93
15	—	+0.89	45° Ditto	—	0.63	51° Cloudy	—	0.32	57° Ditto	—	0.16	49° Dark (rain)	2.00
16	—	+0.76	45° Foggy	—	0.56	54° Bright sun	—	0.20	57° Fine	—	0.20	41° Cloudy ditto	1.72
17	—	0.39	29° Ditto	—	—0.05	49° Very do. do.	—	+0.70	64° Ditto	—	0.55	40° Clear	1.69
18	—	0.50	31° Ditto	—	0.30	49° Very do. do.	—	0.22	67° Ditto	—	0.47	46° Ditto	1.49
19	—	+0.83	36° Ditto	—	0.68	47° Foggy	—	0.37	55° Foggy	—	0.20	44° Very dark	2.08
20	—	0.58	41° Ditto	—	0.39	51° Bright	—	0.57	63° Cloudy	—	0.10	52° Cloudy (rain)	1.64
21	—	0.48	45° Ditto	—	0.36	52° Overcast	—	0.25	59° Ditto	—	0.31	51° Ditto ditto	1.40
22	—	0.62	47° Ditto	—	0.17	56° Flying clouds	—	0.54	61° Fine	—	0.11	52° Cloudy	1.44
23	—	0.34	46° Cloudy	—	0.11	54° Very bright	—	0.11	60° Ditto	—	0.35	47° Clear	0.91
24	—	0.43	42° Ditto	—	0.40	56° Fine	—	0.35	64° Ditto	—	0.42	49° Ditto	1.60
25	—	0.22	41° Hazy	—	0.22	48° Ditto	—	0.20	55° Ditto	—	0.20	41° Cloudy	0.84
26	—	0.57	36° Clear	—	0.10	45° Ditto	—	0.32	51° Flying clouds	—	0.38	40° Dark	1.37
27	—	0.36	36° Cloudy	—	0.51	40° Ditto	—	0.30	46° Fine	—	0.15	38° Ditto	1.32
28	—	0.30	38° Ditto	—	0.42	45° Ditto	—	0.22	51° Ditto	—	0.30	33° Ditto	1.24
29	—	0.34	28° Clear	—	0.29	46° Clear	—	0.44	56° Ditto	—	0.26	39° Clear	1.33
30	—	0.68	29° Cloudy	—	0.42	51° Fine	—	0.34	54° Ditto	—	0.43	51° Dark (rain)	1.87
31	—	0.62	43° Ditto	—	0.39	55° Cloudy	—	0.44	58° Clear	—	0.41	49° Cloudy	1.86
Apr. 1	—	0.64	46° Ditto	—	0.67	55° Ditto (rain)	—	0.61	59° Cloudy	—	0.74	52° Ditto	2.66
2	—	0.66	50° Ditto	—	0.47	56° Fine	—	0.57	59° Ditto	—	0.17	50° Dark	1.87
3	—	0.38	48° Ditto (rain)	—	0.20	57° Cloudy	—	0.61	61° Fine	—	0.23	49° Clear	1.42
4	—	0.55	46° Ditto ditto	—	0.36	54° Clear	—	0.37	57° Ditto	—	0.35	48° Ditto	1.63
5	—	0.53	41° Ditto	—	0.16	52° Cloudy	—	0.15	56° Cloudy	—	0.20	44° Ditto	1.04
6	—	0.34	38° Ditto	—	0.24	52° Ditto	—	+0.71	55° Ditto	—	0.30	51° Cloudy	1.59
7	—	0.16	51° Ditto	—	0.15	57° Ditto	—	0.28	62° Clear	—	0.22	50° Ditto	0.81
8	—	0.39	44° Clear	—	0.43	53° Clear	—	0.34	59° Ditto	—	0.12	45° Ditto	1.28
9	—	0.27	39° Cloudy	—	0.27	46° Cloudy	—	0.19	47° Cloudy	—	0.12	38° Ditto	0.85
10	—	0.15	32° Clear	—	—0.04	44° Clear	—	0.34	50° Ditto	—	0.38	34° Clear	0.91
11	—	0.36	26° Ditto	—	0.17	42° Bright sun	—	0.23	49° Fine	—	0.12	31° Ditto	0.88
12	—	0.46	22° Ditto	—	0.30	42° Very bright	—	0.23	48° Ditto	—	0.25	33° Ditto	1.24
13	—	0.18	28° Ditto	—	—0.08	42° Bright sun	—	0.28	48° Ditto	—	0.28	31° Ditto	0.82
14	—	0.35	24° Overcast	—	0.38	48° Cloudy	—	0.14	54° Cloudy	—	0.56	48° Cloudy	1.43
		21.15	= .470 *average.*		17.24	= .383 *average.*		17.21	= .380 *average.*		13.00	= .289 *average.*	68.60

5 Table shewing the *general result* of the foregoing observations upon the rate of growth of the four plants under examination. Corrected by deducting one-seventh from the first column and adding it to the fourth; in consequence of the period called the Morning in the foregoing tables, and occupying the first place, being too long by one hour, while the Night period, or last column, is proportionably too short: which materially affects the total amount of growth, though too small to be worth notice in the individual observations.

	12 P.M. to 6 A.M. Morning.	6 A.M. to noon. Forenoon.	Noon to 6 P.M. Afternoon.	6 P.M. to 12 P.M. Night.
1. Willow	9.37	+11.13	10.42	9.71
2. Fig	4.37	4.88	5 04	+5.23
3. Passionflower	18.	13.41	+22.44	18.20
4. Vine	+18.13	17.24	17.21	16.02
	49.87	46.66	55.11	49.16

It is probable that these returns will strike different persons differently ; and therefore they are printed at length, and not in the form of an abstract. All such observations are affected by so many circumstances, the exact nature of which it is perhaps impossible to estimate, that safe conclusions can only be drawn from the average of a large number of facts. The observations made in the course of these experiments amounted to 908 ; a number sufficiently large to entitle the conclusions that are drawn from them to some attention.

As has been already stated the great object of the enquiry was to ascertain at what period in the 24 hours plants in hot-houses grow the fastest, and at which the slowest. The table No. 5, shews that upon the whole this happens in the Afternoon ; but that there is a near approach to the same rate in the Morning and Night, the growth in the one case being 55.11 inches and in the others 49.87 and 49.16 respectively. When, however, we look to the details of these results we find that each of the four plants has its own period of maximum growth, the Vine preferring the early Morning, the Willow the Forenoon, the Passionflower the Afternoon, and the Fig the Night. In the Passionflower the preference amounted to something considerable ; and in the Vine to as much as two inches in the course of six weeks ; but in the others it was unimportant. It appears however that in the case of the Willow and Vine, that is to say of the two hardiest of the plants under experiment, the principal growth takes place between midnight and noon, notwithstanding that those are the coldest hours in the twenty four.

I have not seen the paper of Harting* on this subject, quoted by Münter in his observations on the growth of plants ;† but if, as

* In the Tydschrift voor Natuurlyke Geschiedenis en Physiologie, by van Hoeven and de Vriese.

† Botaniche Zeitung, Nov. 3, 1843.

the latter author states, his own observations and Hartings are essentially the same, I may be permitted to quote the one as representing the views of the other. Münter says that he found the diminution of light increase the growth of the branches of the Sycamore, the Vine and the Elder. And this is precisely the common opinion. But it will be seen from what has been just stated, that in the four cases now mentioned, and under their peculiar circumstances, that was by no means universally the case, for in the Willow the greatest growth took place between 6 in the Morning and Noon, of the Passionflower between Noon and 6 in the Evening, and it was only in the case of the Vine and Fig that the dark hours gave the greatest amount of extension. It is however to be observed that Münter's experiments were made in the open air, and therefore may not perhaps be quite suited for comparison with those now detailed.

The period when the Willow and Vine grew slowest was the early Morning in the case of the Willow, and before midnight in the Vine: the difference in the Willow being as 9.37 to 11.13 and of the Vine as 16.02 to 18.13. This seems to show the danger of employing a high Night temperature, which must necessarily force such plants into growing fast at a period when nature bids them repose. In the Fig the smallest growth was made in the early Morning, but the rate of growth of that plant does not appear to be materially different at any period of the day; for, in nearly two months, Night, when it grew fastest, had not an advantage over Morning when its growth was slowest, to the extent of much more than $\frac{3}{4}$ an inch. In the Passionflower the fastest growth was in the Afternoon, the next at Night, and the smallest in the Forenoon, in which respects it is at variance with all the others.

Table 5 also seems to indicate the existence of some regular alternation of growth, from fast to slow; the morning growth of 49.87 diminishing at the next period to 46.66, then rising to 55.11, and then falling to 49.16, which again rises to 49.87; and it is not im-

probable that something of this kind takes place in nature: a period of vigorous developement, requiring a great expenditure of vital energy, being followed by comparative torpor till the vital powers are recruited. For example the successive growths of the Willow are represented by the numbers 10, 26, 20, 20, 25, 26, 26, 10, 42, 31, 45, 17, 19, 40, 18; of the Fig, whose general slow progress is unfavourable to this kind of observation, by 12, 22, 21, 03, 11, 11, 16, 15, and 11, 14, 11, 03, 22, 13, 13, 04; of the Passionflower by 20, 11, 60, 05, 14, 03, 20, 47, 17, 17, 22 and 26, 16, 76, 33, 40, 50, 29, 29, 34, 24, 50, 35; and of the Vine by 20, 34, 12, 32, 55, 31, 31, 37, 62, 54, 28, 52, 74, 50, 14, 22, 38; and so on. Although this kind of oscillation is not absolutely constant, yet it is so very usual, as to appear to be a part of the customary habit of vegetation; and is yet more striking if we turn to the instances of most rapid growth in the four cases before us; for they are invariably succeeded by a corresponding decrease of growth. For example the willow occasionally lengthened as much as four tenths or even more than five tenths of an inch in six hours; these were invariably succeeded by a considerable reduction in growth; thus .42 sunk to .31, .45 to .17, .40 to .18, .40 to .17, and .43 to .20. The maximum of developement in the Fig was rather more than two tenths of an inch in 6 hours; when this or any similar rate was observed the numbers stood thus; .22 fell to .13, .19 to .15, .20 to .10. In the Passionflower the greatest growth was rather more than eight tenths of an inch in six hours; here .82 fell to .10, .79 to .34, .70 to .27. And finally the Vine, which on one occasion grew nearly nine tenths of an inch in six hours, is found to obey the same apparent law; for .89 is followed by .63, .70 by .47, .74 by .50, .71 by .30, and so on.

Another subject of consideration is the cause or causes that tend to produce the fastest and the slowest growth. Fluctuations of temperature can hardly have had any connection with this, because the plants were grown, as has been stated, in a hothouse, the heat of which was maintained at about 73° by day and 65° by night.

Doubtless the plants under experiment were to some small extent affected by variations between these degrees, but 65 is always too high to allow of any serious impediment to vegetation, nor do I perceive any apparent connection between fast and slow growth, and the temperature of the external air. For instance the slowest growth of the Willow took place with the external temperature at 50°, when it lengthened only .03, while with the external air at 34° it grew on another occasion as much as .56; the slowest growth of the Fig was .00 with the external air 54°, and its fastest was .22 with the external air 34; the minimum growth of the Passion-flower was .03, the external air being on one occasion 48° and another 35°, but when it was 41° the Passionflower grew .70; and so of the Vine: when the external air was 44° it only grew .04, but when it was 40° it grew as much as .85. This evidence proves I think conclusively that in the cases under experiment the temperature of the external air in no way affected the rate of growth.

The next question that arises is whether the amount of light can be supposed to have produced any influence. If we compare the degree of light under which the more remarkable growths were made, and which are marked + and — in the tables, we shall find the following result

Fast growth.	Cloudy or Foggy.	Clear.
1. Willow, 7 cases	5	2
2. Fig, 15 cases	5	10
3. Passionflower, 5 cases	3	2
4. Vine, 10 cases	7	3

Slow growth.	Cloudy or Foggy.	Clear.
1. Willow, 14 cases	9	5
2. Fig, 41 cases	18	23
3. Passionflower, 15 cases	8	7
4. Vine, 3 cases	0	3

If we are to judge from the comparison of some of these extreme cases, we should infer that plants grew fastest in cloudy weather, under the influence of diminished light, and slowest in clear bright weather, when light is abundant, as seems to be the opinion of Münter above quoted. Thus in the Vine, out of 10

cases of unusually rapid growth 7 took place in cloudy weather, and only 3 in clear weather; in the Willow, out of 7 such extremes 5 were in cloudy and only 2 in clear weather; and in the Passionflower 3 extremely fast growths took place in cloudy and 2 in clear weather. The Fig is however altogether an exception to this supposed rule, for in 10 out 15 extreme cases it grew fastest under bright light. Possibly this discrepancy may be accounted for by the different nature of the plants under experiment. The Willow, Passionflower and Vine are plants with a very thin skin, and therefore will suffer considerable loss of their fluids, by evaporation under bright light, which must obstruct their growth; the Fig on the other hand, being a plant with a peculiarly thick skin, will suffer much less from this cause, and may indeed demand a much larger supply of light than the others in order to perform its functions in the most efficient way.

But if the experiments were to a certain degree to confirm the general opinion that plants grow fastest in warm cloudy weather, it is also clear that they indicate the presence of other agencies than light and heat, and a regular supply of moisture. The numerous exceptions that are found even in those plants which in rapid growth conform the best to the supposed rule show this sufficiently well, and when we attempt to reduce to it the slowest growths we fail entirely; the facts inclining sometimes one way and sometimes the other.

One of the most singular facts brought out by these observations is the total want of correspondence between the effects produced upon plants by the same external circumstances. The subjects of experiment were placed within a few feet of each other, in a house heated very uniformly, and equally exposed to light, and to every other agent by which it is conceivable that plants should be affected. Yet strange to say, it appears certain that the same causes do not produce the same results when operating upon plants of different species. For example the greatest growth made by

the Sweet Willow was on the 7th of March, when the noon day observation gave .56; at that hour the growth of the Fig had been only .08 and of the Passionflower .24, which was about the average; and of the Vine only .42 which was slightly above it. The greatest growth of the Passionflower was on the 14th of April, when the 6 P.M. observation gave .82 which was .42 above the average; on the same day the Willow had grown .36, or .20 above the average; the Fig .09, or about the average; and the Vine, .14 or .24 *below the average*! If we turn to the instances of impeded vegetation we shall perceive just the same conflicting results. The slowest growth of the Vine was on the 10th of April when the Noon day observation amounted to only .04 to .34 below the average; at that time the Passionflower had grown .34 or .11 above the average; the Fig .03 or .5 below the average; and the Willow .14 or only .2 below its average elongation at that hour.

Upon the whole then it seems that we must regard the growth of plants as a far more complicated problem than is generally supposed. The evidence that has been produced appears to show that there is a regular oscillation of growth during the 24 hours, that the principal developement takes place in the afternoon, (between noon and 6 in the evening), and follows the smallest which occurs in the Forenoon (between 6 in the Morning and noon); and that this oscillation is not connected with light and temperature, because the growth in the Forenoon is less than in the Morning (11 P.M. to 6 A.M.) when the temperature is at its lowest; it may also be inferred that thin-skinned plants grow fastest in the absence of bright light, and possibly that thick-skinned plants obey an opposite law.

But it does not appear satisfactorily that the varying rates of elongation are, under the circumstances of the experiments now detailed, dependent, to any considerable extent, upon fluctuations of temperature, light, or moisture. On the contrary it seems almost certain that some other powerful agent is in operation, the nature of which we have at present no means of ascertaining.

VI. *Notes of a Visit to Mexico, Guatemala, and Equatorial America, during the Years* 1836 *to* 1843, *in search of Plants and Seeds for the Horticultural Society of London. By Mr.* THEODORE HARTWEG.

AFTER a voyage of fifty-eight days I arrived, on the third of December, 1836, at Vera Cruz; and immediately, after landing my luggage, I took advantage of the offer of Mr. De Wilde, a partner in the house of Messrs. Stallforth and Co., to proceed to the farm of Mr. Lavater, a gentleman to whom I had letters of introduction. Two days' riding, over a country without regular roads and through ravines, brought me to Zaquapan, the name of this gentleman's residence.

For three leagues, from Vera Cruz to Santa Fé, the road lay over a sandy plain by the seaside, covered partly by *Convolvulus maritimus*, a large round-leaved *Opuntia*, a *Croton*, and, above all, by *Mimosa pudica*. At Santa Fé the vegetation became more luxuriant, and the small shrubs were replaced by stately *Palms*, *Acacias*, several *Scitamineous* plants, and various *climbers*. However, being anxious to quit the lowlands, which so often prove fatal to new comers, I did not particularly examine them.

ZAQUAPAN is placed at an elevation of about 3,000 feet above the level of the sea, on the eastern declivity of the snow-clad Orizaba, which attains the height of more than 17,000 feet; the climate is temperate and the place surrounded with the richest vegetation I ever saw in Mexico. Upon leaving the savannahs, which are covered with a scanty undergrowth, I entered a forest of *Oaks*, (*Quercus jalapensis, H.B.K.*) and there a change took place as if brought on by magic; *Orchidaceæ*, for which I had been on the look out since I left Vera Cruz, and of the finding of which I had

given up all hope, considering the elevation I had attained, appeared here in the greatest abundance ; the oaks actually seemed to groan under their weight ; *Maxillaria densa* and *tenuifolia*, forming festoons and hanging gracefully over the branches they were growing on, seemed to strive with the larger species of *Tillandsia* for their existence. It was here I met with the beautiful and new *Cyrtochilum maculatum*, and the varieties of it now become so common. In the ravines or rocks I found *Maxillaria aromatica*, *Epidendrum seriatum*, *equitans*, *umbellatum*, *fuscatum*, *cochleatum* (this latter with nearly all its varieties), and *Acropera Loddigesii*. In the more exposed situations, particularly on trees overhanging the perpendicular sides of the ravines, *Stelis ciliaris*, *Dinema polybulbon*, *Isochilus linearis*, *Polystachya luteola*, and the little plant that now bears my name (*Hartwegia purpurea*) were common. The first plant of *Brassavola glauca* I met with was on a *Coccoloba*, in a wood descending to the savannah ; but I afterwards found it on oaks in abundance near this station. To grow this plant, as well as *Hartwegia purpurea*, to perfection, I would recommend a temperature of 65-70° of Fahr., and to be kept in the driest part of the stove. The same treatment may be applied to the thick-leaved *Epidendrums* and *Oncidiums*. Near the same locality I found *Berberis tenuifolia*, forming a shrub 10 to 12 feet high, and at the time covered with its black berries on spikes more than a foot in length. In the more open places, among grass, the *Cebadilla*, or *Asagræa officinalis* was ripening its seeds on a stem four feet high ; the roots, leaves, and particularly the seeds of this plant are used by the muleteers, in a state of fine powder, for killing the maggots in the wounds of their beasts, and occasionally an infusion of it is used in extirpating certain vermin which may be found on the heads of the lower class ; but its employment is not so general as the occasion for it. The seeds of the *Cebadilla* form an article of export in Vera Cruz ; but judging from its low price (six shillings for 25 lbs.) it seems to be in little demand, and scarcely pays the

gathering. The soap plant, *Agave saponaria*, was found in the same locality, throwing up its flower-stem like a tuberose to which in fact it bears much resemblance. Its thick fleshy root crushed is a good substitute for soap, and is abundantly used by those who are too poor to buy that article. This, as well as the *Cebadilla*, appears to be common in the temperate parts of Mexico, having been found in several places, even as far south as Guatemala.

The 27th of December found me on the road to Jalapa, where I arrived on the following day. Being anxious to come to my journey's end, I took the diligence for Mexico; and thence, after delivering various letters of introduction and procuring new ones, I again proceeded to Guanajuato, the place of my destinati n. Upon my arrival I presented my letters of introduction to Mr. Stanley, Mr. Shoolbred, and Mr. George O'Gorman. The latter gentleman being about to proceed to Silao, a place distant seven leagues, I accepted an invitation to spend a week with him, but it being then the middle of the dry season, my exertions did not prove very successful; and upon my return, the necessary arrangements having been completed, I left for the more elevated parts of that mountainous district, which I hoped to find more likely to fulfil the object of my mission.

My first excursion was to the GIGANTE, the highest point of the range of mountains of Guanajuato, where I was rewarded with *Garrya obovata*, then in flower, forming a shrub six feet high; I afterwards found it more commonly on the Bufa, a bluff rock a league from Guanajuato, but all my efforts to procure seeds were only rewarded with a single grain, which I now find did not germinate. *Arctostaphylos pungens* has also been found in these stations, both in flower and fruit. *Berberis fascicularis* forming a shrub 8 to 10 feet high, was covered with flowers, as well as *Ribes campanulatum*. In another excursion I found, both in flower and fruit, a second species of *Garrya* (*G. laurifolia*,) forming an evergreen shrub 12 to 15 feet high, with the *Madroño*, or *Arbutus densiflora*, forming a

shrub, or small tree, covered with delicate white flowers. In the more sheltered situations, in the ravines near the town, *Clematis pubescens* was in full flower. *Oaks,* which cover the greater part of the mountains, were in great variety, but the acorns of the preceding year being all dead, I could procure neither seeds nor specimens. *Pines* were nowhere to be met with.

On the 13th of April I arrived in LEON from Guanajuato, but after two months' disappointment on the then parched up plains and mountains, from which I often returned without having found a single seed or specimen for the herbarium, I often longed for the green woods on the declivity of Orizaba, where vegetation never seems at rest. The only things worthy of notice from this station were *Ipomœa longifolia* and *Lælia majalis;* the latter species I found at an elevation of about 8,000 feet, growing on oaks, and producing such a profusion of large pink flowers in May, that even the Mexicans find it attractive, and stick a few plants on the Limes, (*Citrus medica*) growing before their houses. Of this I sent an abundant supply of plants, but as it has resisted all attempts at cultivation, I would recommend it to be kept in the driest part of the stove, and to be liberally supplied with water during the summer months only. In fields *Lupinus Hartwegii* was common; this seems to be quite stationary, having nowhere else been met with.

On the 17th of June I arrived at LAGOS, where I found the same barrenness during the dry season as at Leon; and after a month's fruitless wandering, I left, on the 13th of July, for Aguas Calientes. Of the more interesting plants found near Lagos, I may mention *Milla biflora*, bearing from one to six of its star-like white flowers on one scape; *Bessera elegans (Caloprasum Geroltianum* of *Schiede)*, the bruised leaves of which, mixed with a little water, are used occasionally for killing flies; *Zephyranthes sessilis; Sprekelia glauca;* and *Habranthus concolor;* the three latter flowering before the leaves appear.

At AGUAS CALIENTES I found a little more occupation, the rains having then set in; but being still dissatisfied with my excursions, I determined at once to leave the high table land and proceed to Bolaños, where I should have the command of a vegetation from 3,000 to more than 8,000 feet of elevation. The town of Bolaños, where I arrived on the 4th of October, is situated in a deep ravine, about 3,000 feet above the level of the sea, and from its confined situation has a higher temperature than might be supposed. The thermometer ranges from 39° to 85° Fahr. in the month of December, but in May it is from 85° to 95° Fahr., and even as high as 102° in the shade. The atmosphere being very dry is favourable to the growth of *Bromeliaceous* and *Cactaceous* plants, of which latter there is a great variety, especially among *Opuntias* and *Cerei.* Of the latter there are species which rise to the height of 30 or 40 feet, and yield an agreeable fruit of the size of a large walnut, with red or yellow pulp; they are known under the name of *Pitaya.* Here also occurred a species of *Agave* with leaves six feet long by four inches broad, from which a spirit is distilled known under the name of *Vino Mescal.* When the plants are of a certain size they are taken up, and the stem, which is about 18 inches long, as well as the leaves, is cut off to the base, which gives the trunk a globular appearance. In this state it is roasted, then crushed, and after passing into the vinous fermentation, *Vino Mescal* is distilled from it. This spirit may be compared to weak whiskey, but its strong smoky flavour renders it anything but pleasant. The plant I never could see in flower.

Ascending the steep sides of the ravine on the western side, I left the region of *Acacias, Bromeliaceæ* and *arborescent Cerei,* and entered that of *Oaks.* After a four leagues' ride, and constant ascent, I arrived at BERBEREA, the Mining Company's wood cutting establishment, situate in the midst of woods at an elevation of more than 8,000 feet above the level of the sea. Here I found, surrounded by evergreen *Oaks, Pines* and *Arbutus densiflora,* the

showy *Befaria mexicana*, forming a shrub of about eight feet high, and at the time covered with its large white flowers.* The pretty little *Mammillaria senilis* I found on rocks in the more exposed situations; its long white spines which at the points are bent backwards seem to defend it against frost. In the more open places *Lupinus leptocarpus, Pentstemon imberbis, Lamourouxia longiflora* and *multifida* were common.

On the 10th of January 1838, I left Bolaños in company with Mr. Floresi the chief commissioner of the Bolaños mines, after having been most hospitably treated by him as well as by Mr. Watson, the company's accountant. On the 14th of that month, I arrived at ZACATECAS, whither my collections from Aguas Calientes and Bolaños had preceded me. The sterility of the mountains and plains about Zacatecas, at this season, was such that I was spared the trouble of making fruitless excursions; I, therefore, arranged my dried specimens and despatched them along with the seeds and bulbs to England. The species collected during the first year amount to 227, of which the following have flowered, or exist in the Garden.

Catasetum maculatum
— citrinum
Epidendrum asperum
— equitans
— umbellatum
— fuscatum
Isochilus linearis
Trichopilia tortilis
Hartwegia purpurea
Oncidium stramineum
— sphacelatum
Lælia anceps
— furfuracea
— majalis
Notylia punctata
Acropera Loddigesii
Brassavola glauca
Liparis elata
Maxillaria aromatica
— tenuifolia
Maxillaria variabilis
— — var. unipunctata
Cyrtochilum maculatum
— — var.
Stelis ciliaris
Polystachya luteola
Dinema polybulbon
Asagræa officinalis
Ferraria sp.
Agave saponaria
Habranthus concolor
Allium striatellum
Sisyrinchium sp.
Milla biflora
Zephyranthes sessilis
Bessera elegans
Sprekelia glauca
Bouvardia splendens
Quercus jalapensis
Crotalaria sp.

* A large parcel of seeds which I transmitted to the Society having failed to grow, this gem of the Mexican highlands remains still to be imported.

Solanum sp.
Lupinus Hartwegii
— leptocarpus
Anemopsis californica
Cuphea sp.
Heliotropium curassavicum
Verbena incana
Parkinsonia aculeata
Malvacea
Prosopis dulcis
Onagracea
Trifolium involucratum
Mimosea
Ipomæa rubrocærulea
— Horsfallii
— longifolia
Convolvulus 3 species
Berberis tenuifolia
Mimosa filicina.

On the 26th of February, 1838, I proceeded from Zacatecas over the high table land to SAN LUIS POTOSI and thence to the Rancho de los Gallitos. Near San Luis Potosi I found *Berberis trifoliata* in great abundance, forming a shrub 4 to 5 feet high; it was then just coming intoflower, and all my efforts to find seeds were useless; but I afterwards received a large supply through the kindness of the bailiff of the Hacienda del Espiritu Santo, and it has since been abundantly raised and distributed at the Garden. The Rancho de los Gallitos, being situate on the eastern declivity of the great table land, in a narrow valley, enjoys a delightful temperature, and is surrounded by constant verdure and noble forests of *Oaks*. It was near this station I found the striking *Berberis Hartwegii* with its long spikes of flowers and pinnate leaves. This desirable species still remaining to be imported, I shall describe its locality particularly, for its seeds will amply remunerate any traveller that may land at Tampico and proceed to San Luis Potosi or Zacatecas. Before reaching the valley of Los Gallitos, on the ascent from Santa Barbara, there is a bluff rock on the right hand side of the road, called "El Contadero," with a small chapel hewn in the rock, and always gaily adorned with flowers and candles by the passers by; this place is held in the deepest reverence by the Indians, from the circumstance of Nuestra Señora de Guadalupe being said to have appeared to several of them, and they cannot pass this place without paying homage to their protectress saint. It was at the foot of this rock that I found *Berberis Hartwegii.*

After exhausting the resources of the last station and despatching my collections to Tampico I returned to ZACATECAS, where I

expected to have found some *Pine seeds* which had been promised me by the Company's forester at Bolaños; but not receiving any, I went there myself without loss of time, and found to my great regret, that the cones had all shed their seeds. I then joined a convoy for Guadalajara whence I returned to Bolaños and Zacatecas, with scarcely an acquisition to remunerate me for that long journey.

Having now received permission to proceed in the direction I thought most proper, always, however, visiting the more elevated parts, because they were most likely to furnish plants that will endure the open air in England, I resolved to leave the arid plains in the north, and proceed to Morelia the capital of the State of Mechoacan. The country about this town, from its broken surface, presents a beautiful vegetation; in the higher parts *Pines* and *Oaks* grow intermixed, and the latter are adorned with a great variety of *Epiphytes.* On the western declivity towards the active volcano Jorullo, I found *Pinus oocarpa* in great abundance, forming a tree 40 to 50 feet high; of this I secured an ample supply of seeds, but from its low situation, I fear it will not be proof against our northern winters. The cones of this pine after being ripe will remain on the tree without opening for two or three years, and the seeds in them are equally as sound as the fresh ones. In the more elevated parts I found the showy *Fuchsia fulgens,* in the greatest perfection, and beside it *Rigidella flammea,* bearing its bright scarlet flowers on a scape 3 to 4 feet high. In the more shaded places the pretty little *Hydrotænia meleagris* and *Arisæma macrospatha* were met with. In pastures, *Bravoa geminiflora* and *Cyclobothra barbata* were common.

After a two months' stay in this interesting country I left for Angangueo, at which place I arrived after a two days' ride over a mountain road, where I observed fine trees of *Pinus leiophylla* and *pseudostrobus,* the former being called "*Ocote chino*" because, from its abundance of resin, it yields the best "*Ocote*" or candlewood; it

attains the height of 100 feet, and is often 4 feet in diameter. *P. pseudostrobus* also grows in the same situation, and may be easily distinguished at a distance by its long slender branches diverging at a right angle from the main stem, as in the species of the section *Strobus*; its chief range is about 8,000 feet, while that of *P. leiophylla* is a few hundred feet lower. On an excursion to the "Campanario" the highest point of the mountains of Angangueo, I saw some remarkably fine trees of the "*Oyamel*" or *Abies religiosa*, 5 to 6 feet in diameter and rising to the height of 150 feet. Its chief range is about 9000 feet above the sea; beyond that elevation its place is supplied by *Pinus Hartwegii* rising to the height of 40 to 50 feet. With the latter I found *Veratrum frigidum*, the leaves of which are poisonous to cattle, *Microstylis macrostachya* and *Juniperus mexicana*, the latter forming a small straggling shrub three feet high.*

On the 30th of October, 1838, I arrived at REAL DEL MONTE, after having crossed once more the high table land of Mexico, but as usual without finding much to reward me. The town of Real del Monte, being situated at an elevation of above 8,000 feet, is surrounded by high ground, of which the "Sumate," the highest peak, rises to the height of 9,500 feet above the level of the sea, the country around being well wooded with a great variety of *Oaks* and *Pines*. On the eastern declivity of the Real del Monte chain of mountains is the deep ravine of Mestitlan, commonly called "Barranca grande," which from its chalky soil is a favourite haunt for *Cactaceæ*. It is the only habitat of *Cereus senilis*, that I am acquainted with in Mexico, the largest plants of which, attaining a height of 24 feet, give the scenery a very singular appearance. On another excursion to the natural bridge called "Puente de Dios" I found *Spiræa parvifolia*, *Quercus petiolaris*, *Lindleya mespiloides*, the latter forming a slender shrub 10 to 12 feet high, and the pretty little *Mammillaria Schiedeana* with seems quite stationary there, having no where else been met with.

* The articles collected about Angangueo, consisting of seventeen sorts of seeds, seven kinds of bulbs and roots, and three species of Epiphytes never reached England.

On the barren hills of ZIMAPAN, *Pinus Llaveana*, forming a tree 15 feet high, was at this time (November) covered with small green cones, which are two years in coming to maturity; *Berberis gracilis*, with its slender stem and red leaf-stalks, and *Berberis pallida* have been found at this station, as well as near the hot springs of Atotonilco el grande. In the ravine of Encarnaçion I found another new species of *Garrya*, *G. macrophylla*, which from its large foliage is by far the handsomest kind; but unfortunately the few seeds I found did not grow. *Juglans nigra* was found in the same locality. Near the Company's farm of "Guajolote" I found several sorts of *pines*, among which *P. patula*, from its smooth slender stem and valuable timber, particularly attracted my attention. Near the small village of Apulco I found *Berberis lanceolata* and *Pinus apulcensis*, and along the road *Cupressus thurifera* forms a stately tree 120 feet high. From this latter station the descent was very rapid to a place called "El Banco," probably so named in allusion to the bank or ledge of rock over which one has to pass at the imminent risk of falling into the ravine below, in order to reach the small village of San Cornelio. The descent to this place is very interesting; at every step there is some change, the noble *Tree fern* (*Cyathea mexicana*) makes its appearance there; *Lopezia lineata, Alstonia ciliata, Lophospermum scandens, Cobæa stipularis, Gaultheria nitida,* were all in full flower. It was in company with those that I found the noble *Habrothamnus fasciculatus* of *Schlechtendahl*, the seeds of which I was unable to procure; it was a very fine shrub about five feet high. It has since been raised in Belgium, and a fresh specimen in flower, communicated by Mr. VAN HOUTTE, Nurseryman of Ghent, has furnished with the assistance of one of my dried specimens the means of preparing the accompanying figure of one of the gayest plants of the Mexican Flora.

By the end of January, 1839, instructions reached me to proceed to Guatemala. I, therefore despatched the collection formed at

Real del Monte, and proceeded again to Angangueo, where by that time I found the pine cones, which I left ripening on my first visit, in a fit state for transmission; on the 20th of February I reached the city of Mexico.

The articles collected in 1838 amount to 307, of which the following have flowered or been raised at the Garden.

Oncidium reflexum, large var.
— sanguineum
Lælia autumnalis
— furfuracea
Stanhopea venusta
Agave sp.
Yucca sp.
Veratrum graminifolium
Hydrotænia meleagris
Rigidella flammea
Bravoa geminiflora
Arisæma macrospatha
Hymenocallis Harrisiana
Dioscorea multinervis
Berberis trifoliata
— pallida
Litsæa glaucescens
Rhamnus umbellatus
Cistus glomeratus
Bouvardia splendens
Melastomacea
Carduus sp.
Scleröon oleinum
Russellia sp.
Quercus petiolaris
Rhus sp.
Lopezia lineata
Sophora secundiflora
Lupinus vaginatus
Acacia sp.
Mimosa sp.
Dalea odorata
Salvia sp.
— Regla
— tubifera
Arctostaphylos pungens
Cobæa stipularis
Celtis canescens
Alnus jorullensis
Spiræa fissa
Cotoneaster denticulata
Cratægus mexicana
Lindleya mespiloides
Rollinia 2 sp.
Carya olivæformis
Philadelphus mexicanus
Cornus grandis
Fuchsia fulgens
Valeriana Napus
Convolvulus, two species
Ipomæa batatoides
Calonyction speciosum
Garrya laurifolia
Lycium macrophyllum
Myrsinacea
? Freziera sp.
Juniperus flaccida
— tetragona
Cupressus thurifera
Abies religiosa
Pinus Russelliana
— Devoniana
— Montezumæ
— Teocote
— oocarpa
— macrophylla
— Hartwegii
— apulcensis
— pseudostrobus
— Llaveana
— patula
— — var.
— leïophylla
Mammillaria pycnacantha
— uncinata
— fulvispina
— aciculata
— auriceps
— fuscata
— macrothele
— horripila
— villifera
— cirrhifera
— longimamma
— bicolor
— quadrispina
— crocidata
— Schiedeana

Mammillaria gracilis
— tenuis
— Wildiana and 22 species not named.
Echinocactus obvallatus
— coptonogonus
— cornigerus and five sorts not named.
Cereus sessilis
— polylophus
— Deppii
— pulcherrimus
Opuntia sessilis
— geometrizans

Upon my arrival in the city of Mexico (Feb. 20. 1839) I lost no time in making the necessary inquiries respecting the best way of proceeding on my new mission to Guatemala, distant nearly twelve hundred miles. After considering how circuitous is the route by sea, I resolved to undertake the journey by land, anticipating that, by going over such an extensive country, I must fall in with some novelties. Having completed the necessary arrangements for such a journey, and procured some letters of introduction to persons in Central America, I gladly accepted a kind offer made to me by Robert Smith, Esq. of OAXACA, to accompany him and his convoy to that place, which we safely reached after a journey of eighteen days.

The valley of OAXACA is between 4000 and 5000 feet above the level of the sea. The greater part being under cultivation, I resolved to visit the well-wooded heights to the east, which are visible from the town. A ride of five miles over a well cultivated country, varied by a few patches of sugar cane and cochineal plantations, brought me to the entrance of the mountains, which are thinly covered with *Oaks* of a dwarfish growth, intermingled with *Arbutus jalapensis* and *oaxacana*. *Cratægus mexicana*, *Alnus mexicana*, *Maurandya antirrhiniflora*, and a species of *Salix* grew along the rivulet. About 500 feet higher at a hut called the Rancho del Estudiante, *Pinus Teocote* and *Leiophylla* appeared, in company with *Cercocarpus Fothergilloides*, and *Tilia mexicana*, the latter forming a lofty tree. In shaded places overhanging the rivulet, *Fuchsia arborescens*, was flowering profusely, forming a little tree 12 feet high with a stem five inches in diameter; a shrubby *Bocconia* and *Garrya laurifolia* were also met with. At the

" Rancho del ojo de agua," the ascent became more steep, the *Oaks* appearing in larger masses and taller trees, and covered with several species of *Tillandsia* and a few *Orchidaceæ.*

Having reached the " CUMBRE " or highest point, there were some stragglers of *Pinus Russelliana* or *Devoniana,* which in want of cones I could not distinguish, and some stately trees of *Abies religiosa.* The *oaks* were no longer clothed with *Tillandsias* and *Orchidaceæ,* but their places were occupied by a brown moss hanging gracefully down the branches in threads nearly three feet long, which gives the trees a singular appearance. *Cornus disciflora, Ceanothus azureus, Rubus trilobus* with its large white flowers, the pretty little *Cuphea pubiflora* and *Melampodium montanum* were found at that station, the elevation of which above the level of the sea, must at least be 8,500 feet. In descending gradually towards " La Parada " which is a kind of inn, the woods consist chiefly of *Pinus Teocote* and *Oaks.* On the latter I found *Odontoglossum nebulosum, Cattleya citrina* and several other species. After passing the bridge, " Puente de Gia," where I found *Echeveria acutifolia,* and the village of San Juan, the *Oaks* ceased entirely, and were replaced by small *Acacias* and *Bromeliaceæ. Orchidaceæ,* although few in number, no longer cling to trees, but seek their nourishment from the ground; an instance of which is *Epidendrum falcatum* with its thick leaves and brittle rhizoma, which was growing most luxuriantly on a heap of loose stones and perfuming the air towards evening with its large white flowers. After descending from the village of San Juan to the Hacienda of Santa Ana, and following the rivulet as far as the mine of Socorro, I crossed a high ridge, where mining operations are carried on, and arrived at the Hacienda del Carmen, an establishment for reducing the silver ore. Carmen, or Castresana as it had formerly been called, is situate in a deep and narrow ravine, the sides of which are well wooded with *Pines* and *Oaks,* the showy *Arctostaphylos nitida, Gaultheria hirtiflora, Vaccinium brachys-*

tachyum, Arbutus jalapensis, Lyonia ferruginea and *Philadelphus mexicanus*. Ascending the steep sides on the right I arrived on the " Monte Pelado " or bald mountain, so called from the upper part being destitute of trees, which gives it a singular appearance compared with the mountain ranges on the opposite side of the ravine. Near " Las Cruces " on the ascent to the Monte Pelado I observed some remarkably fine trees of *Abies religiosa* and *Pinus Ayacahuite*, the latter measuring three to four feet in diameter. Bordering on the limits of trees I found three plants, remarkable for their geographical distribution ; they had previously been known from other countries ; they are *Chimaphila maculata, Pyrola rotundifolia* and *Ottoa œnanthoides*, the latter found by Humboldt near Ibarra in the Andes of Quito.

Having well examined the vegetation about Carmen, I ascended the high ground at the back, crossed Llano verde and arrived at the Indian village of Tanetze. The name of Llano verde (green plain) is given to the mountain intervening as far Tanetze, a distance of eighteen miles, and is derived from a green swampy place in the midst of the wood, measuring some twenty feet square. The climate of Llano verde is termed by the natives " caliente humida," or warm and damp, the temperature being about 70° Fahr. and particularly adapted to the growth of *Oncidium ornithorhynchum*, which I found there in great splendour. In the more elevated parts *Pinus apulcensis, Tilia mexicana, Clethra mexicana*, several *Lycopodiums, Pteris aquilina* twelve feet high, and *Cyathea mexicana* were met with. Descending this ridge, several *Melastomaceæ, Epidendrum rhizophorum* with its bright scarlet flowers, were growing on the outskirts of the wood. From Tanetze I went over a broken road to Tabaa where I found *Befaria lævis* and *discolor* in full flower, growing in company with *Magnolia glauca*, the flowers of which are used by the religious Indians in decorating their places of worship. Tabaa, being situate in " tierra caliente," or the warm country, produces some fine *Pine apples, Oranges, Plantains, Sugar-*

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cane, Cherimoyers and *Coffee.* Descending towards Santa Gertrudes I found a small bean, the seeds of which resemble those of *Abrus precatorius*, and are said to be employed with success against the bite of the little venomous spider called Chiatatlahua.

Passing over the steep ascent of the CUESTA DE MATA HOMBRE I found some *Orchidaceæ* which had previously been seen near Taba; the woods consisted of a variety of *Pines* and *Oaks.* Descending towards the river Tabaa luxuriant vegetation gradually disappears, and the arid soil only produces stunted *Mimosas, Agaves,* tall *Cerei,* and a few straggling specimens of *Cyrtopodium punctatum.* The same vegetation continues ascending the other side towards Villa-alta. From the latter place to Tonaguia, the road leads through many ravines, and the vegetation is similar to that of Tabaa. The inkplant, "Xuquilite," *Justicia atramentaria,* was pointed out to me here as a great curiosity. To produce the ink the foliage and young shoots are enveloped in large leaves, such as those of Plantains, and are gently heated over the fire for a few minutes, after which a black fluid is expressed from them, and used instead of ink. Its chief use with the Indians, near whose houses some plants are generally to be met with, is in a diluted state, to give their linen a blueish appearance. I never found the plant wild; in its cultivated state it forms a compact erect shrub three feet high.

Towards COMALTEPEQUE, species of *Arum, Pothos,* and *Heliconia,* indicating a true tropical climate, make their appearance, the *Mammee* trees are covered with a variety of *Orchidaceæ* and *Tillandsias,* and, such is the fertility of the soil, assisted by a constant heavy dew and mist, that three crops of Indian corn are obtained on the same piece of ground in one year.

Between Comaltepeque and CHOAPAN the mountains are partly destitute of trees; woods of *deciduous Oaks* still occur, and trees of *Pinus oocarpa* which latter seems to enjoy a high temperature.

Near ROABELA, pine apples were growing wild along the road;

the fruit they produced was small and worthless, but was said to improve much when cultivated.

At Yalahui the vegetation is most luxuriant; *Pines* cease to grow, but the higher parts are still covered with *deciduous Oaks.* Here the Cordillera, which had been entered at a distance of two leagues from Oaxaca, is passed; the whole distance being about fifty leagues. Towards Iochiapam the "bajos," or lowlands, bordering on the gulf of Mexico begin, *Palms* become more frequent, and the first *Cotton* plantations occur.

At Playa Vicente *Palms* covered large spaces of ground; and the thermometer stood at 2 P.M. at 94° Fahr.

At the Rancheria de Buena Vista the *Oaks* composing forests are small, vegetation assumes a dry aspect, and the large tracts of savannahs were parched up. Towards the Santuario *Cotton* plantations became more frequent, and three species of *Palm* were observed. The temperature of the lowlands was 95° in the shade during the day, and 83° at night. From this place which is one hundred leagues from Oaxaca, I returned by the same road as far as Comaltepeque.

From the latter place to Totontepeque the vegetation bears a great similarity to that of Tonaguia, from which it is separated by a high ridge. In the more elevated parts the Amber tree, *Liquidambar styraciflua,* forms a large tree and its secretion is highly valued by the Indians in dressing wounds. The village of Totontepeque is about 4,000 feet above the level of the sea, and enjoys a temperature of 65° to 75° all the year round; the climate is particularly well adapted to the growth of *Coffee* of which there are some patches; the Granadilla (*Passiflora stipularis*) is very common, as also the "Aguacate" or *Alligator pear,* a species of *Persea,* with a large globular fruit and thick rind.

From Comaltepeque the road for nearly eight leagues rises continually until it reaches its highest point, the "cumbre" or summit of Totontepeque, which by several barometrical observations

is determined to be between 9,000 and 10,000 feet above the level of the sea; the temperature on the 13th of May at two o'clock P.M. was 58° Fahr. The deep vallies and ravines surrounding this mountain no doubt contribute in a great measure to heighten the temperature, which in combination with the heavy dews and mists, produces a most luxuriant vegetation, which, under ordinary circumstances, could not be expected at such an elevation. The whole mountain, up to the summit, is covered with large *evergreen Oaks* and other forest trees, and their branches were loaded with a variety of *Tillandsia* and *Cereus Ackermanni*, the latter in full bloom, vying in richness of colour with *Epidendrum vitellinum.* The first flowers I saw of that rare and magnificent *Epidendrum* were at such an elevation on the trees that I was unable to recognize what they were, until on the descent, about 400 feet lower, I fell in with more, and procured several large masses; in the same locality I found *Fuchsia splendens* in flower and seed, from which many plants have been raised and distributed.

Towards the village of BETAZA the vegetation is very poor, and the soil, from its aridity, scarcely cultivated. From Betaza to YALINA the road leads again over the river of Tabaa, about two leagues higher than where it had been crossed before, and offers again the same dry parched appearance.

Passing over the " MONTE DE YALINA " I observed towards the summit *Myrtus montana* forming a shrub two feet high, having a great resemblance to the common narrow leaved kind. There also I found again *Abies religiosa* and *Pinus Ayacahuite* which had been met with on the Pelado which is separated by a deep ravine from the Monte de Yalina. Following the steep descent the same plants appeared that had been observed on the ascent to the Pelado, and after an absence of eight and twenty days, during which time I travelled six hundred miles, I returned to the Hacienda del Carmen with several loads of plants.

Having returned to Oaxaca and despatched my collections to Vera Cruz, I resolved to undertake a journey to the south coast. The road leads along cochineal plantations, through the valley of Oaxaca, for nearly ten leagues, and then enters the mountains near San Andres, without offering much more than a few *Mimosas* and *Algarobia dulcis.* Near the Rancho del Aye, the river of Oaxaca, is bordered by fine specimens of *Taxodium distichum*, some of which measure between 4 and 5 feet in diameter. Ascending the mountain, I observed a tall *Cereus*, a *Cyrtopodium*, and a few *Epiphytes*. About two leagues further on, the mountains are well covered with a variety of *Oaks* and *Pines*, and from thence to the sugar plantation of Santa Ana, the same barrenness prevails as had been observed the day before. Near San Miguel Sola, I found *Cypripedium molle* in full flower, growing in the shade of Oaks. The valley of Santa Ana is barren and destitute of trees; sugar cane however is cultivated; but from the dryness of the soil and atmosphere, it does not succeed without artificial irrigation. Towards the Monte de la Virgin the vegetation improves; it was in this wood that I first found the Hand-tree, *Cheirostemon platanoides*, which here forms a tree 60 feet in height; it was at the time in which I first saw it covered with half ripe seed pods. A tree of this kind stands in the Botanic Garden of the city of Mexico, and another grows near Toluca, both of which have attained some celebrity, as no traveller who has seen them has ever failed to extol their rarity, they being considered to be the only two trees of the kind in existence until this station was found out.

Between Juquila, where I found *Catasetum laminatum* and other *Orchidaceæ*, and the villages of Panistlahuaca and Tepanistlahuaca, where I met with *Dioscorea macrostachya*, the savannahs offering but little during the dry season, I found a high ridge and arrived at San Juan Quiage, where I discovered some very interesting plants. Towards Tecojomulco, *Pine woods* intermixed with *Oaks*, continue to the descent to San Andres in the valley of Oaxaca.

After returning to the town of OAXACA and despatching the collections which I brought with me from the south coast, I made an excursion to the CHINANTLA, which had been represented as being particularly worthy of my attention. The district so called lies in the mountains north of Oaxaca and comprises several Indian villages; it is intersected by several large rivers which empty themselves in the Gulf of Mexico, measures about thirty leagues in length, and from one to five in breadth, and produces nearly all the tropical fruits cultivated in Mexico in addition to the *Soursop (Achras mammosa)* which is rarely seen in other parts of that country, and the "*Palao*," a species of *Passiflora*, having a yellow fruit three inches in length and two and a half in diameter; the pulp of this being rather acid is chiefly used in making refreshments.

The whole district of the Chinantla from its broken surface and well wooded mountains offers a great variety of climate and vegetation, but from my visit happening near the end of the dry season my exertions did not meet my expectations. Having returned to OAXACA and despatched my collections to Vera Cruz, I prepared to resume my journey to Guatemala.

The following plants collected in the state of Oaxaca have flowered or been raised in the garden, viz.:

Epidendrum diotum
— cochleatum
— virgatum
— radiatum
— asperum
— bractescens
— arbuscula
— fragrans
— gladiatum
— vitellinum
— falcatum
Oncidium reflexum var.
— ascendens
— sanguineum
— ensatum
— incurvum
— longifolium
Galeandra Baueri
Acropera Loddigesii
Cyrtochilum hastatum
Catasetum maculatum
Catasetum laminatum
— — var.
Maxillaria elegans
Peristeria Barkeri
Gongora maculata alba
Lælia albida
— autumnalis
— acuminata
Ornithocephalus reflexus
Stanhopea saccata
— oculata
Chysis bractescens
Cattleya citrina
Cyrtopodium punctatum
Dioscorea macrostachya
Bessera elegans
Oxalis sp.
Mammillaria divergens
— hystrix
— elegans globosa
Echinocactus macrodiscus

Cereus sp.	Dipsacozamia mexicana
Amaryllis sp.	Bocconia sp.
Eeheveria acutifolia	Rigidella immaculata.

On the 13th of August I finally left Oaxaca for Central America, passing once more near that extraordinary tree *Taxodium distichum*, which I had visited before on an unsuccessful excursion to the ancient palaces of Mitla. This tree stands in the village of Santa Maria del Ule, about seven leagues south-east of Oaxaca; it measures at 6 feet from the ground $32\frac{1}{2}$ Spanish yards, or 98 feet English measure in circumference, and is I believe the largest tree of its kind on record. The stem is not perfectly round, for several board-like excrescences descend the main stem in a longitudinal direction from a height of fifteen feet; these when they reach the ground are from 6 to 8 feet distant from the stem. At the height of 40 feet, the branches, each of which are good-sized trees of several feet in diameter, separate. The top, enormous although it appears, is not in proportion to the stem, both together measuring barely 100 feet in height. The tree grows in dry burning soil, it is surrounded by houses, and is in perfect health; Santa Maria del Ule, the name of the village in which this tree stands, derives the apposition "Ule" from the tree, and is still known by this name in other parts of the country where the same language is spoken. When we consider that at the conquest of Mexico the Spaniards allowed the name of this tree to be affixed to the patron saint of the village, the tree must have been even at that period of considerable size. This, although the tree is common in the milder parts on the eastern declivity of the great mountain range north of the city of Mexico, is the most southern specimen of the kind with which I fell in, and it has in all probability been brought from the north, and planted there like the Hand-tree, the two solitary specimens of which existing in the city of Mexico and near the town of Toluca, must have been brought from the south.

After leaving the valley of Oaxaca, the road gradually descends to the shores of the Pacific, along which I travelled for about one

hundred and thirty leagues. The rainy season having set in, and having already experienced difficulties in passing some rivers, I was obliged to abandon my plan of following the coast road to Guatemala. From the farm of Espiritu Santo, I struck in for the mountain road of Chiapas, and after a journey of three days I arrived at COMITAN, which is the last Mexican town on the frontiers of Central America, it is distant from the city of Guatemala one hundred leagues. After entering the confines of Central America, the road becomes more uneven until it reaches the highest point at Rosario, which, judging from the stunted appearance of *Juniperus mexicana* growing a few hundred feet above the range of *Abies religiosa,* is at an elevation of nearly 11,000 feet.

Near GUEGUETENANGO and CHIANTLA I first found *Lælia superbiens,* then opening fine rose-coloured flowers, which were supported on a stem from 3 to 5 feet in length; in the more shaded places, overhanging mountain torrents, I have observed the flower-stem sometimes 9 feet in length, but never more.

On the 26th of October I arrived in the town of QUEZALTENANGO, and finding the surrounding mountains likely to furnish plants suited to fulfil the object of my mission, I resolved to stay there. Quezaltenango is about 8,500 feet above the level of the sea, and is situated at the foot of the active volcano Xetuh, the summit of which is about 1,500 feet above the town; the lower portion of this mountain is partly cultivated; a few hundred feet higher up some stunted oaks, on which I found *Odontoglossum pygmæum,* are growing in company with *Comarostaphylis arbutoides,* the latter forming a tree 18 feet in height; near the crater of Xetuh I found *Fuchsia cordifolia* and the little *Polygonum volcanicum.* This volcano, when it first broke out, which is about forty-eight years ago, had been densely wooded, and a few large, dry, and blackened stems of *Pinus Ayacahuite,* some of which are still erect and overhanging the crater, bear witness to the fact. At the foot of Xetuh, as well as that of the neighbouring mountain

Santa Maria, the *Ayacahuite*, there called *Tablas*, is still common, and there are equally large trees with those observed on the Pelado in the Sierra of Oaxaca. It was at this station that I at length succeeded in obtaining a supply of ripe cones, which have been amply distributed among members of the society, and from which plants have been raised at the garden. It will no doubt prove quite hardy. Following the road at the foot of Xetuh for nearly three miles, I arrived at "Las Cruces," where I found *Solandra grandiflora* producing large yellow flowers, and clinging for support to other trees. Las Cruces is merely a place where a few rudely made crosses are fixed by the road side, in order to apprize the traveller, ascending from the lowlands, that he has reached the highest point on the road; this place is held in great veneration by the Indians, who often adorn the crosses with flowers, or burn incense, which is the produce of an *Elaphrium* found in the province of Soconusco. Descending gradually from Las Cruces towards the village of Santa Maria, I first found *Achimenes pedunculata* with a slender naked stem, 1 foot in height, having a few leaves at the top, and seldom bearing more than two flowers. The original plant is scarcely to be recognized in the large fine specimens cultivated in this country. *Peristeria Barkeri, Odontoglossum grande*, and *Rossii*, with *Oncidium leucochilum*, were also met with near Santa Maria.

Travelling to the village of Retahluleu, in the lowlands, near the shores of the Pacific Ocean, the road passes along the foot of the mountain Santa Maria, until it descends into the gloomy forests of the temperate region, where the showy *Justicia umbrosa, macrantha*, and *inæqualis*, all of which failed to vegetate in the gardens, attracted my attention; there I also found for the first time *Quercus Skinneri*, with its extraordinary acorn; the specimens rose to the height of 50 feet.

Passing from these temperate parts towards Retahluleu, *Orchidaceæ* became more plentiful, and *Epidendrum Stamfordianum, E. asperum, Fernandezia elegans, Brassavola venosa* and *Lælia*

acuminata, were found in abundance growing on the *Calabash* tree (*Crescentia Cujete*) in that village. This tree is peculiarly adapted to their growth.

On an excursion to SUNIL I passed near the morass of Almolonga, where I found *Escobedia linearis* growing in great abundance, and apparently enjoying a swampy situation, although often seen in dry and heavy soil. The root yields a yellow dye, resembling saffron. Upon entering the defile, after leaving the morass, I found *Cobæa macrostema* in full bloom, covering with slender vines anything with which it happened to come in contact.

The village of Sunil is situated on the western declivity of Xetuh, nearly on the same level as Quezaltenango, but, being surrounded by high mountains, the flora is materially different from that on the burnt up fields near that town.

The following is a list of the plants procured about Quezaltenango, which have flowered or exist at the Garden :

Oncidium leucochilum
— nebulosum
Odontoglossum grande
— Rossii
— pulchellum
Epidendrum asperum
— Stamfordianum
— aurantiacum
Peristeria Barkeri
Maxillaria variabilis
Dinema polybulbon
Hartwegia purpurea
Hexadesmia fasciculata
Trichopilia tortilis
Fernandezia elegans
Brassavola venosa
Lælia acuminata
— superbiens
Fuchsia cordifolia
Phaseolus sp.
Comarostaphylis arbutoides
Passiflora stipulacea
Centropogon cordifolius
Salvia involucrata
— pulchella
Cuphea pubiflora
Rubus trilobus
Polygonum volcanicum
Convolvulus sp.
Bouvardia strigosa
Pinus Ayacahuite.

Having packed up my collections, and having failed to procure mules to carry the chests to Guatemala, I hired some Indians to transport them on their backs ; this sort of conveyance, although novel to me at that time, I subsequently made use of whenever quadrupeds could not be procured, or when care and despatch were required. The only drawback connected with the Indians is, that they must before starting get intoxicated with the money they receive on account

of freight, and then by way of diversion they commence fighting; this done, they resume their journey with sorrowful countenances, and contrive by forced marches to arrive within the stipulated time. The load for an Indian weighs from 80 to 150 lbs., and with this they will walk ten and fifteen days in succession, performing each day a journey of from twenty to twenty-five miles. The remuneration they receive is half of that of a mule load, which is always composed of two parcels, or about one shilling for every ten miles.

Once more I resumed my journey to Guatemala. After leaving Quezaltenango, and travelling about two miles along the swampy plain, which is considered to be the source of the river Motagua, the road gradually rises towards the village of TOTONICAPAN; the ascent becomes then more steep, and the sides of the mountain become covered with large evergreen *Oaks*, with scarcely any under shrubs except a few bushes of *Viburnum discolor*. Passing gradually from the region of *Oaks* to that of the *Pinuses*, I once more found some remarkably fine trees of *Abies religiosa*, together with *Pinus Hartwegii*. I may here observe, that this is the most southern station of *Abies religiosa*, with which I am acquainted, it having now been found at various places between 15° and 22° S.L.; its chief range however, is about 19°.

Passing over a slightly undulated surface I reached the high table land, which is thinly wooded with stunted trees of *Alnus mexicana*, on which I found in great luxuriance, the pretty little *Arpophyllum alpinum*, with short spikes of dark purple flowers. The elevation of this plain above the sea is at least 10,000 feet, and the black volcanic soil of which it is composed is chiefly occupied by a long coarse grass, which grows in large tufts, giving not the slightest chance to other plants. Cattle will not eat this grass.

Having crossed the plain I arrived at the descent to the farm of Argueta, which is known by the name of CUESTA DE LA ALHAJA; here my attention was arrested by the showy *Oxylepis lanata*, resembling in habit the dwarfer kinds of *Helenium*, and

bearing several large yellow flowers on a stem of 18 inches in height.

Near this place a singular custom is observed by the Indians, who, with loads on their backs, put their feet into a hollow rudely resembling the foot of a human being, made by nature in a large flat rock by the road-side. This precaution they say is necessary in order to prevent them from making a false step on the descent to Argueta. I have no doubt that the carriers of my chests of plants from Quezaltenango, went through this ceremony of "footing."

Descending the Cuesta de la Alhaja, where I found *Passiflora membranacea* and the pretty *Rigidella immaculata,* the latter growing in a dry hard loam, the ground becomes more uneven, and is for the greater part covered with evergreen *Oaks,* and *Pinus oocarpoides.* Near Santiago, I found *Pinus filifolia,* producing large cones and long foliage and rising to the height of 40 feet; judging from its habit and the exposed situation in which it was found, it will no doubt prove as hardy as most Mexican Pines.

Having arrived at the descent towards the village of Mixco, a beautiful panorama of the town of GUATEMALA, which lay in the plain below, burst open to the view; the pleasure I felt after such a long and toilsome, but withal interesting journey, may be easier imagined than described. The plain or rather valley of Guatemala, which is fifteen miles in length by nine in width, enjoys a delightful temperature, resembling that of the month of May or June in England; the lowest temperature I observed was in February, when the thermometer occasionally falls to 60° in the morning, and the warmest was in April, when it sometimes rises as high as 80°; during the rest of the year it ranges from 70° to 75°.

The plain in which Guatamela is situated, is about 5,000 feet above the level of the sea, and yet *Sugarcane, Bananas, Coffee, Cherimogers, Custard Apple, Peaches, Spondias Myrobalanus,* (from the fruit of which "Chicha," a favourite beverage of the

Indians is prepared), and *Indian Corn* succeed at this elevation. *Morus multicaulis,* which has lately been introduced for rearing the silkworm, thrives most vigorously and produces leaves during the whole year. The silk produced is of the finest quality and promises to become an important article of exportation. The greater part of the valley of Guatemala is under cultivation, and produces excellent crops of *Indian Corn ;* the ravines by which it is surrounded on three sides, vary in depth from 100 to 500 feet; they have evidently been made, and are still being made daily, by the water from the plain and surrounding mountains, after a heavy shower, having washed away the thin cover of ferruginous clay, till it reaches the crumbled pumicestone of which the plain is composed, when that light material is also carried away by the flood. The sides of these ravines slope at an angle of 45° more or less, and a rivulet of insipid water winds its way through most of them. The pumicestone is not suitable for vegetation, unless it is well decomposed and mixed with vegetable matter; in this state it is the favourite soil of *Sobralia macrantha,* which is one of the most splendid of the Guatemala *Orchidaceæ*, unfolding, for several weeks in succession, rich crimson flowers, from 6 to 8 inches in diameter, supported on a reed-like stem, and forming a beautiful contrast between the dwarf, but not less handsome, *Achimenes longiflora,* growing by its side. This *Achimenes,* like *pedunculata,* has also been materially improved by proper cultivation. The flowers have become nearly double the size and are produced in greater abundance than in its native place.

The valley of Guatemala is destitute of trees, and for the greater part also of shrubs; it is chiefly on the sides of the ravines that *Oncidium Cavendishianum, leucochilum* and *Epidendrum aurantiacum* are to be found.

One of my first excursions after examining the vegetation about Guatemala was to the "Chorro," a little cascade by the roadside, about 12 miles N. E. of the capital; here I found again, though

not plentifully, *Brassavola glauca,* with large white lip and slightly scented flowers, growing in company with *Cyrtochilum maculatum* var., *Russelianum, Epidendrum varicosum,* and *fragrans, Brassia guttata* and *brachiata,* the latter remarkable for its long narrow sepals spotted with brown. On the steep rocks overhanging the rivulet the "*Papelillo*" (*Caloseris rupestris Benth.*) with long panicle and large leaves which are white underneath, formed a beautiful object. The stem of this plant is covered with a yellowish wool, which is used as a substitute for tinder. The woods about this place are composed of evergreen *Oaks,* and especially of *Pinus oocarpoides,* which attains the height of 50 feet; the chief range of this is at an elevation of about 4,000 feet, and though it descends nearly to the shore of the Bay of Honduras, it never occurs on the South coast, or higher than 5,000 feet above the level of the sea. It is to be feared that it will prove too tender for English gardens. The same may be said of *Pinus tenuifolia,* which I found in ravines east of Guatemala, and on the mountains of Choacus in the province of Vera Paz, only a few hundred feet higher than *Pinus oocarpoides.* In the more sheltered places I often found this 100 feet in height and from 3 to 4½ feet in diameter at the base. Scarcely a shrub or herbaceous plant is found in these *Pine* tracts.

On an excursion to the lowlands bordering on the Pacific Ocean, the road led me through the valley of Guatemala, and after a short but rather steep descent, I passed the lake of AMATITLAN, and entered the village of the same name. The dry atmosphere and arid soil are not favourable to much variety in the vegetation, but are well adapted to the cochineal which is here produced in great abundance and of the finest quality. Following the gradual descent, and entering shaded woods, I met with *Stanhopea saccata, Trichopilia tortilis, Mormodes lineatum,* the latter scenting the air with its fragrant flowers, and *Cycnoches ventricosum.* The latter, now well known for its tendency to sport never did so as far as I could

observe in its native haunt. Although Mr. SKINNER, who was with me on one of these excursions, called my attention to the then supposed *C. Egertonianum,* yet among several dozen plants that I had collected out of flower, after careful examination I could only discover the short flower stem of *Cycnoches ventricosum.**

The village of ESCUINTLA, where I next arrived, is on the same level as Retahluleu, which I had visited from Quezaltenango, and it yielded me the same plants found at the latter place with the addition however of *Catasetum maculatum,* and *integerrimum, Aspasia epidendroides, Oncidium ascendens,* and the large variety, of *ampliatum, Epidendrum macrochilum, Brassavola venosa, Trigonidium Egertonianum* and *Cattleya Skinneri;* the latter I found inhabiting the highest trees, in abundance, in full bloom in the month of February, in the damp and gloomy woods looking towards the sea.

From Escuintla I returned over MEDIO MONTE to Antigua Guatemala. The name of Medio Monte is applied to the wood between the fire and water volcanoes, which at their base are only a few hundred yards apart; this wood furnished me with some fine specimens of *Oncidium ornithorhynchum, Maxillaria cruenta,* and *aromatica;* and in the higher parts, *Oncidium macrantherum,* and *O. Wentworthianum,* with a long flower stem resembling in habit *O. leucochilum*; here also a few small plants of *Barkeria spectabilis* have been found. Some fine masses of the latter as well as of *Epidendrum Skinneri, Oncidium Cavendishianum* and *Stanhopeas* are sometimes seen in the villages of Mixco, Sumpango, and Alotenango, where they are stuck on the trees near the houses, merely surrounded at the roots with clay to prevent them from being

* A similar freak of Nature I observed in Guatemala with *Sobralia macrantha* which had its usual large crimson flowers on one stem, whilst on another of the same plant I observed the small and condensed flowers of the genus Evelyna. This plant I carefully removed and transmitted to the Society's Garden with the head of the Evelyna attached to it. It has since flowered, but only produced the flowers of Sobralia macrantha.

blown down, by this means they form better plants and flower more freely than in their native woods. The Indians, who grow them for the sake of the flowers to adorn their altars, are generally very reluctant to part with these plants.

The Volcan de Agua, or water volcano rises to the height of 12,600 feet above the level of the sea, and is about 6,000 feet higher than the plain on which Antigua Guatemala or the old town of Guatemala is built; it is regular on all sides, representing the form of a sugar loaf with the point cut off. It received the name of Volcan de Agua from the Spaniards, under Alvarado, who after subduing the country, formed a settlement at the foot of this mountain. It, however, was soon destroyed by a torrent of water issuing forth from the summit, and carrying every thing before it. The deep furrows which the water made in its descent, although now again covered with vegetation, are still plainly visible even from the new town of Guatemala, a distance of 25 miles. The lower region of this volcano is under cultivation, or is pasture land, while at an elevation of 9,000 feet a girdle of trees passes round it, the most conspicuous of which is *Cheirostemon platanoides,* which also occurs at the same elevation on the Volcan de Fuego, where it attains the height of from 60 to 80 feet, often forming a stem of 4 feet in diameter. Having passed this region, a long grass covers the ground, which makes the hill, which is steep, still more difficult to ascend. A *Veratrum* like *Zygadenus volcanicus,* was found here, throwing up a branched flower stem of 3 feet in height, covered with pendulous scented flowers of a dingy yellow; and by its side *Berberis gracilis,* which I recognised immediately by its slender growth and red petioles, although without either flower or seed. After much halting on account of the steep ascent and rarified air, which made breathing continually more difficult, I at length arrived at the brink of the crater, climbing the ascent from the village of Santa Maria in four hours. A few minutes delay would have deprived me of the view I had, for the clouds arose rapidly from the

plain below, and soon obscured even the interior of the crater in such a manner that I could not clearly distinguish its sides afterwards, although I encamped in it for the night, and staid there part of the next day.

The crater is similar to an immense caldron, about 300 feet in width at the top and 150 feet in depth. Its nearly perpendicular sides admit of only one descent, at a place where they appear to have fallen in, or to have been carried away by the eruption of the water. The bottom is perfectly flat and consists of black volcanic ashes, strewed with a few blocks of porphyry which had been detached from the sides above. The present state of the crater is not easily reconciled with the account of eruption of water that occurred about three centuries ago; for if we suppose the water to have sprung from an internal opening of the crater, how can we account for its present level state? and if, as some have supposed, the water that burst forth, had been collecting in the crater during the heavy periodical rains with which that country is visited, how could the volcanic ashes, of which the bottom is composed, have retained it? With regard to the ashes, found in the crater, we might ascribe the circumstance to the Fire volcano close by, (which even now throws out a column of smoke), if we had had any large eruptions on record posterior to that of the water. That the so called water volcano had at one time largely contributed in covering the country for leagues around with beds of ashes and pumice stone, we cannot for a moment doubt, considering its enormous crater. And with regard to the eruption of water, we shall not be far from the truth in ascribing it to a waterspout alighting near the crater; a circumstance not at all improbable, for such occurrences are not rare. I have observed the effects of three of very recent date, one in the mountains of Oaxaca, and two in the Andes of Popayan, where the water in its descent swept away the largest trees, and left furrows similar to those on the Volcan de Agua.

The bottom of the crater, which is but scantily covered with vege-

tation, furnished *Aplopappus stoloniferus;* and a Commelynaceous plant which constitutes a new genus (*Lampra volcanica Benth.*) was found unfolding pretty white flowers where the blocks of stone afforded it a little protection, whilst in the more exposed places it had been nipped by frost. The only tree which grows near the crater and even inside of it is *Pinus Hartwegii;* and these specimens are equally large with those observed in Mexico. The cones which had been but sparingly produced that season were then (in August) half ripe; and the squirrels which visit that desolate region had eaten them even in that state.

During my stay in Guatemala, I saw this mountain twice covered with snow, or rather with hailstones; but the top not being within the limits of perpetual snow, the latter seldom lies more than two or three days. No water being found on the ascent after leaving the village of Santa Maria, I had to include that article among my provisions, although I was rather liberally supplied from above, during the night which I passed in the crater.

Crossing the plain of Guatemala in a southerly direction, I ascended the gentle acclivity of the CUESTA DE PINULA, and arrived at the farm of ARRASOLA, which is situated about 500 feet above the plain. The undulated surface, clothed with a green sward and detached shrubberies, presented a beautiful picture, and strongly reminded me of park scenery in England. In the shaded woods in dells, I found *Odontoglossum grande*, bearing from 3 to 4 large showy flowers on a spike; in the more exposed situations *Ornithocephalus inflexus, Cœlia macrostachya*, with dense spike of rose-coloured flowers, and *Oncidium pergameneum, bicallosum*, and the latter with a flower-stem equalling the leaves, and large yellow flowers, were collected.

Having here received instructions from the Council of the Society, to proceed to the equatorial Andes, I packed up my collection; duplicates from which I remitted from time to time.

The following is a list of plants collected in Guatemala, which

have flowered in the garden; besides these, however, there are many Orchidaceous and other plants, which have as yet not shown any disposition to flower.

Aspasia epidendroides
Barkeria spectabilis
Brassavola glauca
— venosa
Brassia brachiata
— guttata
Catasetum integerrimum
— maculatum
— Russellianum
Cattleya granulosa
— Skinneri
Cœlia Baueri
— macrostachya
Cycnoches ventricosum
Epidendrum alatum
— aurantiacum
— diotum
— incumbens
— lacertinum
— macrochilum
— polyanthum
— selligerum
— Skinneri
— Stamfordianum
— varicosum
— virgatum
Govenia liliacea
— sp.
Lacæna bicolor
Lælia superbiens
— acuminata
Maxillaria aromatica
— concava
— cruenta
— densa
Mormodes lineatum
— aromaticum
Notylia bicolor
Odontoglossum bictoniense
— elatum
— grande
— pulchellum
Oncidium ampliatum large var.
— ascendens
— bicallosum
— Cavendishianum
— Cebolleta
Oncidium filipes
— leucochilum
— macrantherum
— microchilum
— ornithorhynchum
— pergameneum
— sphacelatum
— — var.
— Suttoni
— Wentworthianum
Sobralia macrantha
Spiranthes rosulata
— cerina
— grandiflora
Stanhopea saccata
— Wardii
— — var.
Trichocentrum candidum
Trichopilia tortilis
Trigonidium Egertonii
Achimenes longiflora
— pedunculata
— rosea
Aristolochia Gigas
Begonia crassicaulis
— incana
— vitifolia
Cheirostemon platanoides
Drymonia punctata
Fuchsia splendens
Gesnera longifolia
Hydrotænia Meleagris
Hymenocallis patens
Ipomæa rubro-cærulea
Lampra volcanica
Niphæa oblonga
Pancratium sp.
Passiflora membranacea
Pinus filifolia
— tenuifolia
— oocarpoides
Quercus callosa
— Skinneri
— — var.
Rigidella immaculata
Salvia prunelloides
Zygadenus volcanicus.

Being unable to procure a passage to GUAYAQUIL whither I had

orders to proceed, in consequence of the little traffic carried on between the two countries, I eventually sailed from the port of REALEJO, and after what might be considered a fine passage of 36 days, I landed at CALLAO on the coast of Peru. Having stopped here for a few days, I made an excursion from LIMA towards ACOBAMBA. This is situated in the CORDILLERA, which rises behind the capital and which attains its highest point at the Toldo de nieve, (tent of snow), being a broad sheet of perpetual snow visible from Callao. The lower part of this Cordillera, and indeed the whole coast of Peru, from the total absence of rain, presents a most desolate appearance, and the eye in vain searches for a green spot for relief. Entering the ravines, I observed a few plants of *Cereus senilis* and another tall growing species; the former however seldom attains more than 10 feet in height, nor has it the long white hairs with which that species is covered in Mexico. Near the solitary bluff rock, called Paucacha, which is barely within the influence of the periodical rains, I found a beautiful bright orange-flowered *Tacsonia*, also *Oxalis rubrocincta, Berberis dealbata, Colletia horrida,* and a *Hesperomeles* with long thorns.

Returning to LIMA, and finding that the vessel in which I had engaged a passage was to sail shortly, I repaired to CALLAO, and after a passage of nine days with a favourable breeze and current, we entered the river Guayas, on the right bank of which the town of GUAYAQUIL is situated. The country hereabouts is flat and well wooded, particularly along the river; but the myriads of mosquitoes which inhabit the thickets, make the examination of their flora anything but agreeable. The thermometer ranges here from 80° to 85° throughout the year, with little variation during night; this temperature, which is considerably less than that of the east coast in a similar latitude, is no doubt owing to the high Cordillera in the interior, and also to numerous snow clad mountains, of which, Chimborazo is visible from the coast. These no doubt contribute in lowering the temperature.

Orchidaceæ which I expected to find in abundance in the shaded woods along the river, were comparatively scarce, and my exertions were only rewarded with four species, which although they arrived safely have not yet flowered.

Towards the middle of May the periodical rains, which make travelling in the Andes next to impossible, having ceased, I resumed my journey to Loxa. A three days sail in a canoe down the river Guayaquil, brought me to the village of Santa Rosa, from whence I started on the following day for the village of Paccha, which is distant about fourteen leagues, for the purpose of procuring mules to bring up my luggage. This journey gave me some insight with regard to the roads that I should have to take in pursuing my occupation in the Andes. The road as far the Tambo de la Chonta, a distance of seven leagues, leads through a narrow ravine, and crosses the rivulet which flows in it sixty-five times; these repeated crossings although the water is scarcely 3 feet in depth, became at every step worse, for the large stones, which had been carried down during the rains, rendered the footing of mules unsafe. The Tambo de la Chonta, where I arrived towards the evening, is only a thatched roof supported on a few beams, affording the weary traveller no other accommodation than that of shelter; the ascent which had hitherto been comparatively trifling becomes steeper; and the large trees, *Palms,* and thick underwood bespeak a damp climate.

The village of Paccha, (if twenty mud-built houses deserve the name), is about 5,000 feet above the level of the sea and enjoys a delightful temperature; *sugarcane, coffee, yuca,* (*Jatropha Manihot*), *oranges, pine-apples,* come to perfection at this elevation. The shaded woods and dells furnished me a great variety of *Orchidaceæ*, among which an *Oncidium* from its singular habit particularly attracted my attention; this plant throws up a slender branched flower stem from 10 to 12 feet in height and produces pseudobulbs from the stem itself; these in the course of time form plants

again, sending their offspring a couple of yards higher up, and thus often a single plant runs up a tree 25 feet in height. This species together with twenty more, which I collected in these damp woods, was ill fitted to withstand the long journey round Cape Horn; and, consequently the greater part of them when they arrived in England were dead; of those surviving, *Stanhopea Bucephalus* and *Lycaste lanipes* alone have flowered.

From Paccha towards Loxa, the ground is extremely uneven. Near the Indian village El Sisne, at an elevation of nearly 9,000 feet, I found *Stenomesson aurantiacum*, displaying bright orange flowers, and several large-rooted species of *Macleania*, with *Myrica macrocarpa*, from the seeds of which the industrious Indians obtain a green wax, employed for religious purposes. Descending to the valley of EL CATAMAYO, the presence of *Agaves*, *Mimosas*, a triangular *Cereus*, *Schinus Molle* (here called "Molle," or pepper tree), *Elaphrium* and *Crotons*, indicated a dry atmosphere. A tree called *Arupo* (*Chionanthus pubescens*,) inhabiting the steep sides of the mountains, formed a conspicuous object; its delicate rose-coloured flowers, produced in great abundance before the leaves, are visible at a great distance, and contrast well with the apparently dead vegetation around. From the farm of El Catamayo, where sugar-cane is cultivated, to the town of LOXA, a distance of five leagues, the main Cordillera has to be crossed; this part of the Andes is of easy access and is scarcely more than 8,000 feet above the sea; it has formerly been a *Cinchona* forest, but since the *Quina* has become an article of commerce, the *Cinchona* has gradually disappeared, on account of the bad system which is pursued in obtaining the bark by uprooting the plant. The best *Quina* or *Cascarilla* is yielded by *Cinchona Condaminea*, which is 6 feet in height; several other species of arborescent *Cinchonas* abound in the mountains of Loxa, but their bark is considered to be inferior to this. In the more exposed situations of this Cordillera, I collected several

species of *Befaria,* also *Macleanias* having large fleshy roots, *Vacciniums, Fuchsia loxensis, Barnadesia spinosa, Berberis glauca, Alströmerias, Hypericum laricifolium,* yielding a yellow dye, a *Viburnum* and *Lupinus semperflorens,* the latter forming a shrub 12 feet in height, and flowering profusely throughout the year.

Orchidaceæ also, are to be met with at this elevation, but they are more abundant in the woods a few hundred feet lower; the damp atmosphere which prevails about Loxa, is favourable to the growth of that class of plants, but renders them unfit to undergo a long journey; of seventy species which I collected here, very few succeeded after their arrival in England. The thermometer at Loxa, stands generally between 60° and 65°; the rainy season sets in in December and lasts until May, when it is followed by the "paramos," light but continued rains unaccompanied by thunder. These paramos are peculiar to the more elevated parts of the Andes, where that term is also applied to the grass lands (pajonal) above the regions of trees; they seldom pass their prescribed limits by descending into the warm vallies or down to the coast; an instance of which I observed on my arival at Loxa from El Catamayo, for in a distance of five leagues, in the former place it had been raining for several days, whilst in the latter every thing was burnt up by the continued drought. About Loxa, the lower region of the mountains, to which I made frequent visits, furnished me with *Tropæolum peltophorum, Lupinus arvensis; Berberis loxensis,* an *Oreocallis,* several species of *Rubus, Hypericum, Monnina,* and *Alströmeria,* whilst the more elevated parts were rich in *Compositæ* and *Ericaceæ.* A small tree called *Ducu* (*Clusia Ducu* Benth.) is also found in this region, exuding a yellowish transparent resin from the stem, which is used as incense.

The *Wax palm* (*Ceroxylon andicola*) occurs at an elevation of nearly 8,000 feet; the stem, which attains 60 feet in height

and from 12 to 18 inches in diameter, is in the larger specimens covered with a thin coating of a whitish, waxy substance. This when purified in hot water, becomes compact, and acquires a cream colour. It is generally mixed with a little tallow if made into candles, being of too brittle a nature to be worked by itself; it then burns with a bright flame without any smell or smoke. The quantity of wax from a full grown palm varies from 12 to 25 pounds.

In the ravine leading to the village of Saraguru, I found *Brugmansia sanguinea* called *Guando,* forming a shrub 12 feet in height; the seed-pod of this, as well as the seeds, is considered to be highly narcotic, and to cause death. In this ravine I likewise found a *Walnut* allied to *Juglans nigra,* called *Tocte,* several Melastomaceous and Myrtaceous shrubs, *Eccremocarpus longiflorus,* and a pale yellow flowering *Tropæolum,* the latter ascending to the tops of the highest trees. On the bluff rocks near the village, I observed *Phycella chloracra,* having scarlet flowers tipped with green, but from its inaccessible habitat, I could procure only a few bulbs.

After a stay of four months in Loxa, during which time I formed large collections of plants and seeds, I resumed my journey, and arrived at the town of Cuenca, which is forty leagues north of Loxa, and became my head quarters. The greater part of the road, after emerging from the ravine of Saraguru, leads over the Paramo (grass lands) at an elevation of from 10,000 to 11,000 feet above the level of the sea. Near the Tambo de Mariviña, I found *Odontoglossum pardinum,* growing on trees, associated with *Berberis conferta* and *glauca,* two species of *Osteomeles,* a tall shrubby *Lobelia* with large yellow flowers, *Alströmerias,* a *Ribes* with greenish flowers and several shrubby *Hypericums.* Having made repeated excursions to the neighbouring mountains with no great success, I visited the warm valley called *Yunguilla,* where I was rewarded with the bulbs of a yellow flowering *Cybister,* a scarlet

Phycella, and a large rooted *Gesnera,* all flowering before the leaves appear.*

Towards the end of January 1842, I left Cuenca and reached Riobamba, by passing over the Paramo del Assuay, which lies at an elevation of 15,000 feet above the level of the sea. This "highway," being the only means of communication between the two towns, is justly dreaded by the natives, as the sudden hail-storms and rain, with which this desolate region is visited, make travelling at all times a hazardous undertaking. The highest point of Assuay is about 500 feet above the road, or 15,520 feet above the sea, and is consequently scarcely within the limits of perpetual snow, although repeatedly covered with it in summer, during the dry season, which is from June to October, when the snow-line in the Andes descends much lower than during the rainy season or winter. At this elevation several species of *Gentiana, Culcitium rivale, Sida phyllanthos,* with a large purple flower resembling a *Crocus,* and a small creeping *Lupine* were observed; in wet places a red *Lycopodium,* called in the Quichua language *Hatun condenado* (great devil) is abundant; highly medicinal properties are ascribed to this plant by the natives, who employ it for the cure of that horrible disease, Mal de San Lazaro (*Elephantiasis tuberculata*), which is so common in the equatorial Andes; but I could not learn that they derive any benefit from its application.

Riobamba, or Ciudad de Bolivar, as it is now called, agreeably to a late decree of the equatorial government, stands in the midst of a sandy plain almost destitute of vegetation, at an elevation of 9,472 feet. The majestic Chimborazo, which rises gradually out of the plain at a distance of six leagues, attaining the height of 21,441 feet above the sea, with Carguairazo a little to the north, and Tunguragua and Capac Urcu, called El Atar by the Spaniards, in the north east, form a magnificent mountain prospect if viewed from the

* The box containing the above, as well as the seeds and dried specimens collected about Cuenca, were despatched viâ Guayaquil, but never reached England.

great square in Riobamba. Chimborazo, like most elevated plains in the Andes, is destitute of trees and shrubs; the highest range of cultivation we find is, at the farm of CHUQUIPOLLO, at an elevation of 11,500 feet; *barley, potatoes,* "*Mayua*" (*Tropæolum tuberosum*), "*Oka*" (*Oxalis tuberosa*), and *Lucerne*, form the chief objects of agriculture. Here I found *Salvia macrostachya*, a *Castilleja*, *Plantago*, *Calceolaria ericoides*, *Alchemillas*, a *Ranunculus*, a *Rumex*, with large leaves resembling *R. Patientia*, several species of *Baccharis*, *Grasses* and *Ionidium parviflorum*. The latter is called "*Cuichunchullu*," (*i. e.* bowels of the guinea pig,) and is in repute as a remedy for the mal de San Lazaro, but from the frequency of that disorder in Riobamba, Huano, and Cuenca, where the *Cuichunchullu* is so easily procured, and where no complete cure of confirmed leprosy has ever been effected, it may be concluded that its virtues are greatly exaggerated.

The ascent from the farm of Chuquipollo to the snow-line, a distance of nine miles, is easily accomplished in three hours; judging from the eye, the distance seems much less than it really is, a deception arising from the brilliancy of the snow. Two or three species of grass, which leave but little chance for other plants, densely cover the ground, until at an elevation of about 15,000 feet, they gradually give way to the more interesting Alpine flora, which extends to the limits of perpetual snow. Among the plants collected here, I may mention several species of *Gentiana*, *Valeriana*, *Lycopodium*, *Draba aretioides*, *Arabis andicola*, a *Jamiesonia*, *Cerastium densum*, *Astragalus geminiflorus*, several species of *Lupinus*, among which *L. alopecuroides*, was remarkable for its dense inflorescence of 2 feet in height, and an *Halenia*. *Culcitium reflexum*, *nivale* and *rufescens*, or "*Fraylejon*," with a woolly head and large cernuous flowers are found in abundance on the sandy tract within a few yards of the perpetual snow and at an elevation of 15,800 feet above the level of the sea.

Having made several excursions to Penipe, the lake of Colta

near the ruined town of Caxabamba and Tunguragua without finding many plants worthy of notice, I repaired to QUITO, about the middle of March 1842.

The eastern declivity of Pichincha, at the foot of which the town of Quito is built, at an elevation of 9,400 feet, retains its verdure throughout the year; here *Brugmansia sanguinea,* a shrubby *Euphorbia, Duranta triacantha, Prunus salicifolia, Clematis sericea,* are employed in forming fences, whilst on uncultivated spots and by the sides of ravines we find *Thibaudia acuminata, Salvia rubescens, Lamourouxia virgata, Gesnera ulmifolia, Lupinus pubescens, Œnothera sinuata, Sedum quitense,* several species of *Fern, Calceolaria, Solanum, Cestrum, Melastoma, Compositæ,* and a few *Grasses.* The region of arborescent shrubs, which extends to an elevation of 12,000 feet, is chiefly composed of *Buddlea pichinchensis, interrupta,* and *bullata, Barnadesia spinosa, Monnina nemorosa, Andromachia igniaria,* the bark of which is used for tinder, several species of *Hypericum,* and *Baccharis, Eupatorium glutinosum,* called *Matico,* whose dried leaves reduced to powder are useful in stopping bleeding and healing wounds, *Gaultheria pichinchensis, insipida,* and *purpurascens, Vaccinium Mortinia, Cremolobus peruvianus,* the rich *Fuchsia ampliata,* with *Rubus glabratus, pichinchensis,* and *glaucus,* the latter bearing a large black fruit resembling a mulberry in flavour. Here was also a kind of *Bamboo,* which formed impenetrable thickets.

The region we next enter is that of the Paramo, or Pajonal, presenting to the eye an unvaried expanse of long grass, constituting the pasture of the Andes; here we find *Ranunculus peruvianus, Valeriana hirtella, Andromachia acaulis, Swertia umbellata, Werneria nubigena,* a dwarf shrubby *Vaccinium, Gentiana sedifolia,* the smallest in the Andes, the corolla of which closes immediately when taken up, *Petroselinum depictum,* and near the sandy crater, in addition to most of the plants observed on Chimborazo, *Sida pichinchensis, Draba alyssoides,* and in clefts of rocks the rare *Saxifraga andicola.*

Pichincha attains a height of 15,979 feet, and although repeatedly covered with snow, the latter seldom remains long. The line of perpetual congelation under the equator is fixed by Humboldt at 15,736 feet, but this limit admits of local variation, as for example on Cayambe, where a broad sheet of snow extends over a gradual descent, and is found as low as 14,200 feet; whilst on Chimborazo, where the form of the mountain is more conical, it ascends to 16,000 feet. The crater of Pichincha, which looks like an immense ravine, having an opening towards the west coast or in the opposite direction of Quito, is inaccessible on all sides, and is probably not less than a thousand feet in depth. Many centuries have elapsed since it existed in full activity, when it must have largely contributed to covering the country around with pumice-stone and ashes; now, though still smouldering, its present commotions are the enfeebled efforts of age.

The western declivity of Pichincha, to which I made frequent excursions, afforded me *Andromachia solidaginea, Valeriana microphylla, Viburnum pichinchense, Arracacha acuminata, Tacsonia quitensis* with an oblong acidulous fruit, *Rubus stipularis, Fuchsia sylvatica, sessiliflora, scabriuscula,* and *dependens,* the latter forming a large shrub, producing numerous scarlet flowers at the points of the slender branches which give it a graceful appearance, an *Iochroma* with large dark blue flowers two inches in length, *Mutisia Clematis, Mikania corymbulosa, Miconia pichinchensis, Macleania cordifolia,* having a large fleshy root, *Thibaudia pichinchensis, Palicourea lineata,* and in the more temperate parts towards the uninhabited woods of Esmeraldas, *Centropogon calycinus,* and *prostratus, Begonia longirostris, Quercus Benthamiana* forming a middle sized tree with wide spreading branches and large leaves which are brown underneath, the rare *Fuchsia longiflora,* several species of *Orchidaceæ,* among which *Epidendrum amethystinum,* and *porphyreum* and *Cypripedium macranthum,* are the most remarkable, the latter preferring wet situa-

tions and producing large greenish brown flowers on a scape of three feet in height. The singular *Ophioglossum palmatum*, already known from having been received from various parts of the globe, is also found here growing on trees, but it is by no means common.

Travelling to Antisana, whose broad cone covered with perpetual snow is plainly visible from Quito, I crossed the well cultivated valley of Chillo to the farm of El Isco, which is situated at an elevation of 11,400 feet; here the cultivation of barley and potatoes is carried on with success; the plants which I observed there were *Onoseris eriocephala*, *Senecio pimpinellifolius*, and *Antisanæ*, *Culcitium rosmarinifolium*, *Erigeron campanulatum*, *Liabum acaule*, and in the clefts of rocks overhanging the farm-house *Stenomesson Hartwegii*, producing its scarlet pendulous flowers on a scape of 18 inches in height. I may here observe that bulbous plants are by no means common in the Andes, for besides the last mentioned I only found two other species on old walls in Quito, where they have been apparently planted, and *Phædranassa obtusa*, on the banks of the Guallabamba and in the valley of San Antonio.

Following the gradual ascent from El Isco, I arrived at the farm-house of Antisana, which is situated in a grassy plain at an elevation of 13,434 feet, and within four miles of the snow-line. This ground being extremely rich in Alpine plants, furnished me with *Gentiana diffusa*, and *rupicola*, *Ranunculus nubigenus*, *præmorsus*, and *sibbaldioides*, *Castilleja nubigena*, *Euphrasia stricta*, *Liabum erigeroides*, *Bowlesia acutangula*, *Werneria densa*, *Aster rupestris*, *Culcitium ascendens*, and *hyoseridis*, *Eryngium humile*, *Valeriana plantaginea*, *Baccharis humifusa*, *thyoides*, and *alpina*, *Ribes frigidum*, and two species of *Urtica*, together with *Chuquiraga lancifolia*, with showy heads of yellow flowers, which is the only shrub that supplies the herdsmen of the estate with fuel. On the eastern slope of Antisana, near the swampy outlet of the Lake of Mica, I observed *Gentiana limoselloides*, *Plantago nivalis*, *Vaccinium empetrifolium*, and *penæoides*, *Lysipoma montioides*, *Liabum erige-*

roides, Azorella aretioides, Werneria disticha, Potentilla andicola, Alchemilla nivalis, and a moss-like plant supposed to be a species of *Sisyrinchium,* forming large tufts several feet square, and rising from one to two feet above the surface of the soil; these masses are so compact that with great difficulty I succeeded in separating a piece.

The proper season for travelling having arrived, I became desirous to resume my journey northwards, I accordingly despatched the collections made about Quito to Guayaquil, and set out on the 21st of July for POPAYAN, where I arrived on the 17th of August, after a painful journey of twenty-six days.

The town of Popayan being situated in the valley of the river Cauca, at an elevation of 5,900 feet, enjoys a mild climate, the thermometer ranging between 65° and 70° throughout the year; most European fruits are cultivated here by the side of *Cherimoyers, Coffee, Sugarcane, Pine-apples, Granadillas,* and several kinds of *Plantain;* among the latter I observed one called *Pacifico* or *Otahete,* esteemed for its fruit, which for size and flavour is between *Musa sapientum* and *paradisiaca;* it is of recent introduction, and judging from the name has been brought from some of the islands in the Pacific Ocean.

The Central Cordillera at the foot of which the town of Popayan is built, and which is scarcely ever less than 10,000 feet in height, attains its greatest elevation in the peaks of Puracé, and a little more to the south in Zotara; they are both considerably above the snow-line. The slopes of these mountains and the mountain-pass of the Paramo de Guanacas, which connects the valley of the Cauca with that of the Magdalena, afforded me ample occupation. Here I found *Myrica mollis, Psidium sericiflorum, Eugenia Guayavilla, Meriania majalis,* called *Flor de Mayo,* being a beautiful shrub with large purple flowers, *Palicourea popayanensis, Escallonia caracasana, Cinchona pubescens* or "*Palo requeson,*" a tree from 20 to 30 feet in height producing sweet scented

flowers, *Loranthus catacarpus, Cerasus opaca, Quercus Humboldtiana,* forming a large forest tree, and occupying a range from 7,000 to 8,000 feet, *Gaultheria anastomosans, Siphocampylus cordifolius, lanatus,* and *Columnæ, Befaria phillyreæfolia,* an evergreen shrub of striking beauty, producing rose-coloured flowers in abundance at the points of the shoots; in the more elevated parts, *Fuchsia canescens,* and *corollata, Macleania pubiflora, Thibaudia hirtiflora,* and *parvifolia, Ribes leptostachyum, Linochilus floribundus, Ceratostemma rigidum, Vaccinium densiflorum,* and *acuminatum, Espeletia grandiflora, Lobelia rupestris,* and *andina, Myrtus oxycoccoides, Valeriana bracteata* and *Apium glaucescens.* The *Cinchona* woods of Pitayo, which are famous on account of the bark they produce, lie about forty miles N.E. of Popayan in the Central Cordillera, at an elevation of 8,000 feet; the species which abounds there is *Cinchona lanceolata,* called "*Red bark,*" a tree between 40 and 50 feet in height, the bark of this, is however, considered inferior to the "*Orange bark,*" the produce of *Lisyanthus densiflorus* which is a shrub with large shining leaves and yellow flowers, belonging to the natural order *Gentianaceæ.* Here I collected *Mikania rufa, Coffea marginata,* the large scarlet flowering *Mutisia grandiflora, Begonia trachyptera, Spigelia pedunculata,* the leaves of which prove fatal to dogs, *Viscum clavatum,* and *squamigerum, Clethra bicolor, Gaultheria cordifolia, Thibaudia pubescens,* and *pendula, Vaccinium epacridifolium,* and several minute *Orchidaceæ.*

The western Cordillera seldom attains more than 9,000 feet of an elevation and terminates abruptly towards the coast, presenting a boundless uninhabited forest. The principal objects derived from this expedition were four species of *Palms,* among which was the "*Chontadura,*" having a slender prickly stem between 40 and 60 feet in height, with a raceme of flowers eighteen inches in length, and producing from 150 to 200 yellow nuts about the size of a large green walnut. The thick rind surrounding the seed of these,

when boiled resembles in flavour a Spanish Chesnut; in boiling, the rind yields an oil which may be used for culinary purposes or for burning.

Towards the middle of December after packing up what I had collected about Popayan, I proceeded with my collections to BOGOTA. Passing over the Central Cordillera by the Paramo de Guanacas, I entered the valley of the Upper Magdalena river at the village of La Plata, and following the arid banks of that river I arrived on the 1st of January 1843, in Bogota, after a fatiguing journey of twenty-days. The sudden change of temperature from the warm valley of the Magdalena to the cold table-land of Bogota, was probably the cause of my contracting a fever and ague, from which I suffered during the month of January, and which prevented me from following my occupation during that time.

The town of Bogota being built at the foot of the western Cordillera, at an elevation of nearly 9,000 feet enjoys a mean temperature of 56° and notwithstanding the swampy plain in front, through which the river Bogota slowly winds, the town is considered healthy.

The aspect of the vegetation round Bogota is at first glance anything but encouraging for a botanical collector; upon a closer inspection, however, I found that the apparently barren mountains were covered with some very interesting plants, and particularly the ravine which descends the Cordillera, and whose clear stream supplies the town with water; here I found *Gaultheria ramosissima*, and *conferta*, *Gaylussacia buxifolia*, *Chætogastra microphylla*, with small yellow flowers, *Spiræa argentea*, *Thibaudia floribunda*, with a large fleshy root, *Fuchsia petiolaris*, an *Oncidium* with yellow flowers supported on a stem three feet in height, and a half-climbing *Begonia* with large scarlet flowers adorning the rocks with gay colours. Following the steep ascent to the Paramo, I observed *Linochilus rosmarinifolius*, *Palicourea vaginata*, *Eupatorium amplum*, *vacciniæfolium*, and *latipes*, *Drymis granatensis*, called

"*Palo de aji,*" or pepperwood, in allusion to its sharp pungent bark, which tastes like a Capsicum, *Berberis glauca, Gentiana corymbosa,* and *Swertia plantaginea.*

Crossing the plain of Bogota to the south west and passing the Paramo de San Fortunato, where I found *Cestrum buxifolium, Siphocampylus asper, Baccharis microphylla, Lupinus bogotensis* and the shrubby *L. interruptus,* I descended to the more temperate regions towards Fusagasuga and Pandi; here among *Araceæ* and *Piperaceæ,* I found *Fuchsia verrucosa,* a dwarf shrub with small scarlet flowers, *F. hirtella,* whose slender half-climbing stems elevate themselves to the height of 25 feet, seeking support from other shrubs, *Siphocampylus hispidus, Centropogon oblongus, Calycophyllum coccineum,* a shrub with large scarlet bracts, *Cinchona nitida,* a middle sized tree with a panicle of white sweet scented flowers resembling a Lilac, *Ficus prinoides,* or *India rubber-tree, Vernonia rubricaulis, Stevia compacta,* several species of *Ferns* and some *Orchidaceæ,* amongst which were the tall-growing *Cyrtopodium punctatum,* and the large crimson flowering *Cattleya maxima.*

On my journey to Zypaguira (celebrated for its inexhaustible salt-mine), and from thence to Pacho, I observed *Symplocos Alstonia, Alnus ferruginea, Tagetes zypaguirensis, Castilleja fissifolia, Viburnum triphyllum,* and *molle,* several *Melastomaceæ,* and *Orchidaceæ,* among which were an *Oncidium* with a twining flower stem, and *Odontoglossum crispum,* having a spike two and a half feet in length, and producing from 20 to 27 large white flowers, with a pinkish hue on the outside of the sepals, and orange spots on the lip.

Having here received instructions to return to Europe with my collections, I left Bogota about the middle of April for Honda, where I was to embark in the Magdalena. A few days' delay at Guaduas, occasioned by the difficulty of procuring fresh mules, afforded me an opportunity of examining the flora; here I pro-

cured *Rondeletia brevipes, reflexa, eriantha*, *Mikania leiostachya*, and *caudata*, *Daphne cestrifolia*, with yellow berries which are poisonous to cattle, *Spigelia hamelioides*, and *Brownea*, the latter forming a tree with large heads of crimson flowers which develop themselves for several weeks in succession. Ascending the wooded heights in the East, I found in a forest of the *Wax Palm*, (*Ceroxylon andicola*), *Gustavia speciosa*, *Caliphruria Hartwegiana* a bulbous plant with white flowers, *Peristeria elata* and *Achimenes picta*, which is another valuable addition to that interesting genus. In its native habitat this *Achimenes* prefers dry rocky ground, in places not much shaded, where it scarcely attains more than five inches in height, seldom producing above two or three of its finely mottled bright orange flowers upon a stem. The accompanying figure was taken from one of the first specimens that flowered in the garden of the Horticultural Society.

Soon after my arrival in Honda, having readily procured a boat capable of holding my collections, I embarked on the Magdalena for Barranca, and crossed from thence by land to Carthagena. The rapid descent on the Magdalena afforded me but little opportunity of examining its wooded banks, for the boatmen being hired to convey me to my place of destination, it was their interest to make the journey with as little delay as possible.

Finally leaving the mainland about the middle of May for Jamaica, where, during some days delay, I added a few things from the Port Royal mountains to my collection, I embarked for London on the 3rd of June, and arrived safely on the 24th of July 1843, after an absence of six years and ten months.

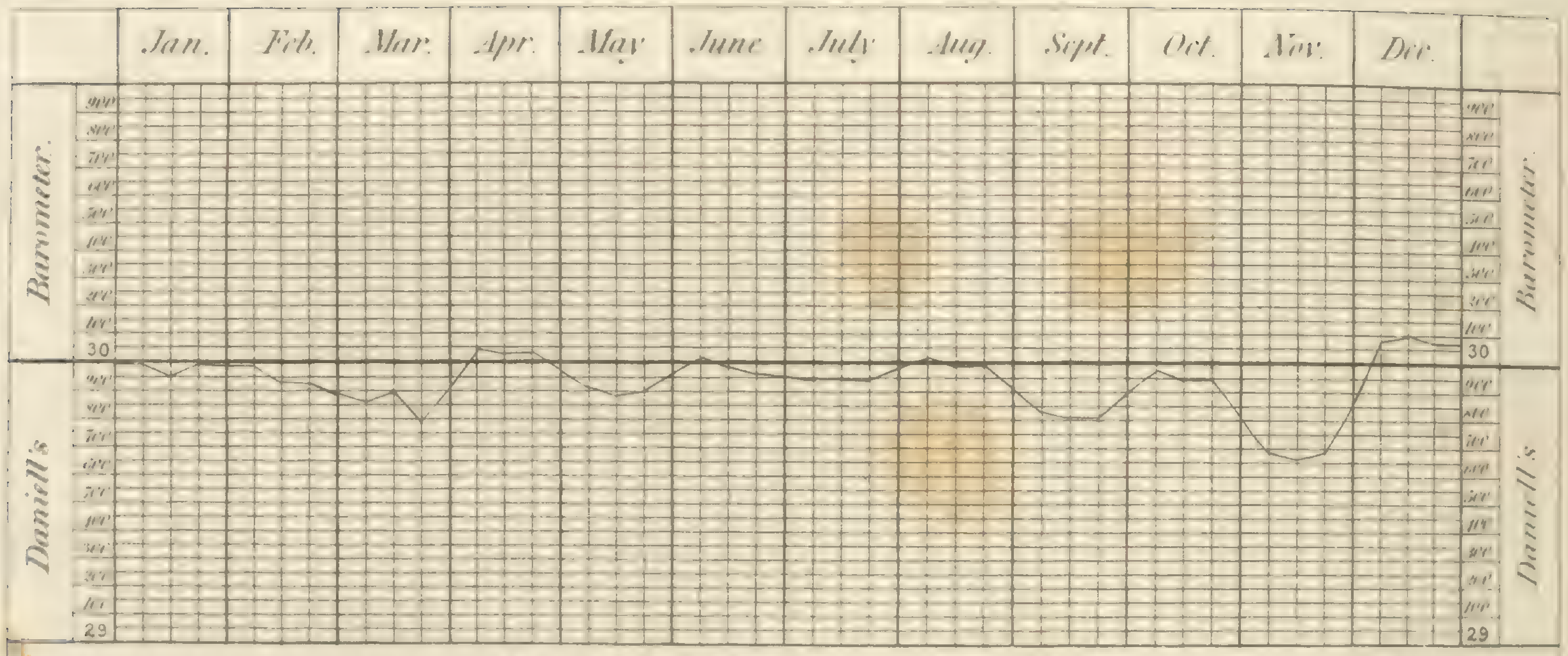
The following is a list of the plants, as far as their names can at present be ascertained, that have been introduced from Columbia:

Achimenes picta
Angelonia salicariæfolia
Brownea Ariza
Canna glauca
Catasetum latilabre
— ochraceum

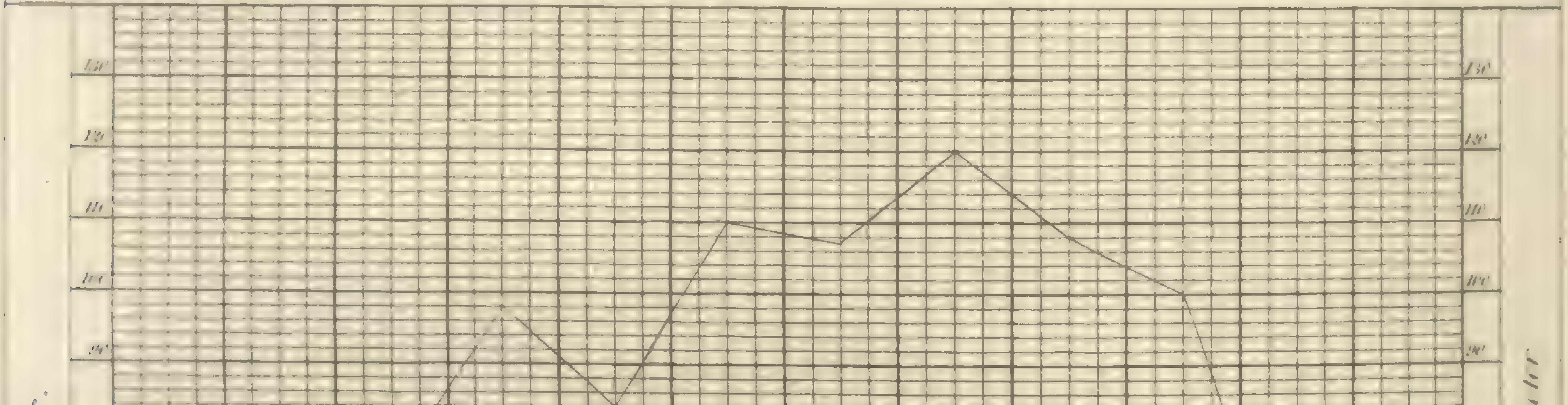
Caliphruria Hartwegiana
Cattleya maxima
Ceratostemma Salapa
— lanceolatum
Ceroxylon andicola
Cereus sepium
Conium Arracacha
Cyrtopodium punctatum
Epidendrum ceratistes
Gesnera Lindleyana
— vistita
Habrothamnus cyaneus
Helcia sanguinolenta
Ipomæa codonantha
Liparis elata
Lupinus bogotensis
— arvensis
— interruptus
— pubescens
— ramosissimus
— semperflorens
— Tauris
Lycaste lanipes
Maxillaria bractescens
— scabrilinguis
Musa (Pacifico)
Odontoglossum crispum
Oncidium rupestre
Peristeria elata
Phædranassa chloracra
— obtusa
Pilumna laxa
Rubus glaucus
Stanhopea Bucephalus
Stenomesson aurantiacum
— Hartwegii
Tacsonia manicata
— mollissima
Thibaudia floribunda.

From Jamaica:

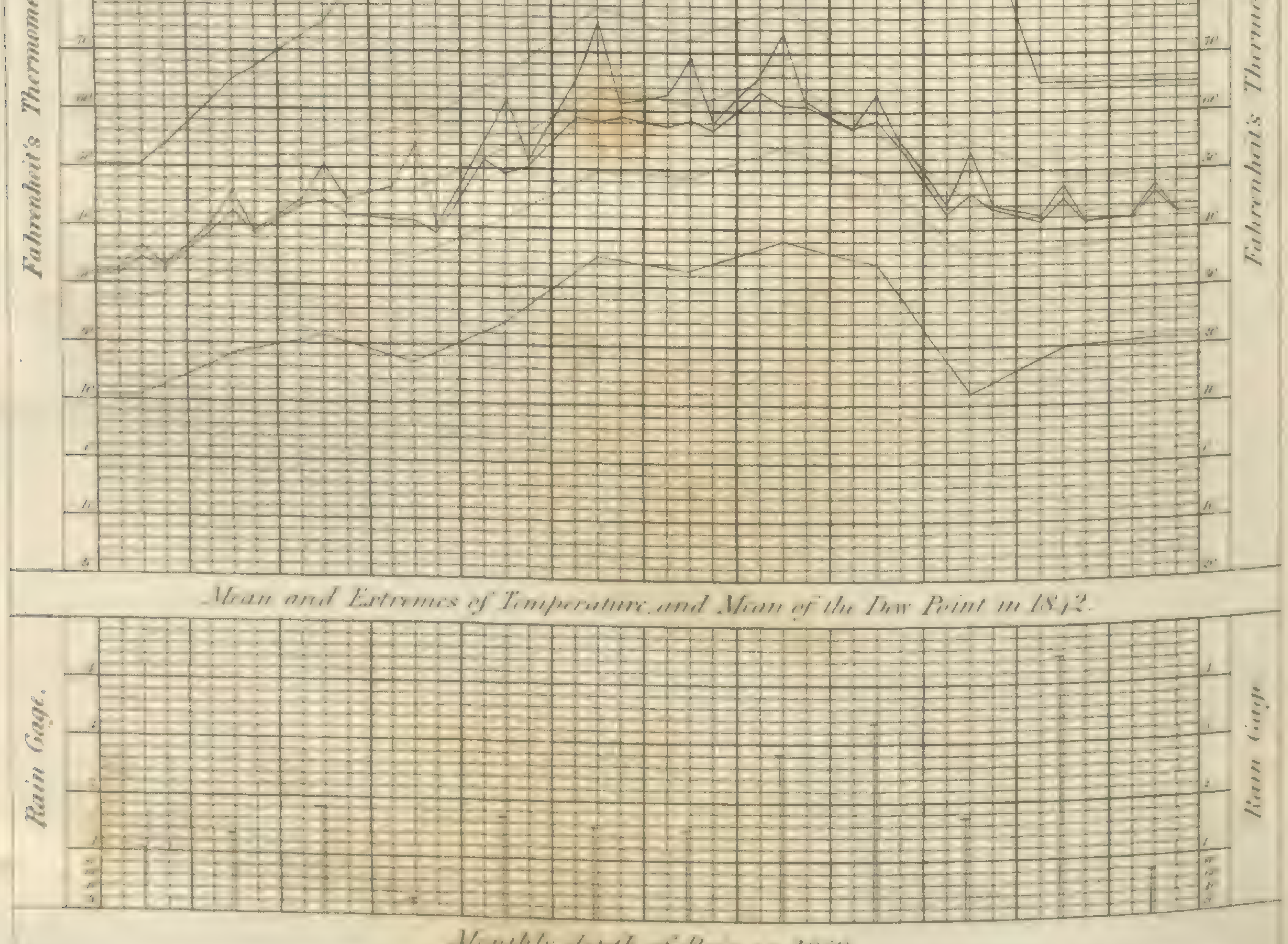
Aristolochia grandiflora
Bletia hyacinthina
Calanthe veratrifolia
Crinum Commelini
Epidendrum fuscatum
Garrya Macfadyenii
Hymenocallis Barringtoniæ
Oncidium luridum.



Mean Height of the Barometer in 1842.



Mean and Extremes of Temperature, and Mean of the Dew Point in 1842.



Monthly depth of Rain in 1842.

VII. *Journal of Meteorological Observations made in the Garden of the Horticultural Society at Chiswick during the year* 1842. *By Mr.* ROBERT THOMPSON.

This Journal has been kept on the same plan as the preceding.

JANUARY.

1842.	Days.	Morning. Barom.	Morning. Hygrometer.			Morning. Weather.	Noon. Barom.	Noon. Hygrometer.			Noon. Weather.	Night. Barom.	Night. Hygrometer.			Night. Weather.
S.	1	30.197	36	32	4	Very Fine	30.179	40	38	2	Slightly Overcast	30.171	32	32	—	Cloudy
S.	2	—.170	34	34	—	Overcast	—.106	36	36	—	Ditto	—.053	37	37	—	Sleet
☾ M.	3	—.013	32	32	—	Ditto	29.988	34	28	6	Clear	29.947	27	27	—	Clear
T.	4	29.929	29	26	3	Ditto	—.929	33	29	4	Ditto	30.005	31	31	—	Slight snow
W.	5	30.038	32	29	3	Frosty, cloudy	30.008	36	36	—	Overcast	—.051	34	34	—	Overcast
Th.	6	—.164	33	33	—	Ditto	—.163	38	32	6	Cloudy & Fine	—.311	34	32	2	Ditto
F.	7	—.450	25	25	—	Snow-flakes	—.446	33	25	8	Do. & Frosty	—.445	32	32	—	Snowing
S.	8	—.373	30	30	—	Sharp Frost	—.410	32	23	9	Overcast	—.316	30	24	6	Ditto
S.	9	—.233	28	20	8	Frosty, Overcast	—.163	30	21	9	Snow	—.140	29	27	2	Ditto
M.	10	—.125	29	28	1	Ditto	—.094	31	23	8	Dry cold haze	—.026	30	30	—	Overcast
● T.	11	29.984	32	32	—	Ditto	—.005	34	34	—	Drizzly	—.007	32	32	—	Snow-flakes
W.	12	30.050	32	32	—	Ditto	—.031	36	36	—	Clearing	29.989	33	33	—	Slightly overcast
Th.	13	29 878	32	32	—	Snowing	29.828	32	32	—	Snowing	—.961	31	31	—	Snowing
F.	14	—.560	32	32	—	Overcast	—.558	36	36	—	Cloudy, fine	—.704	36	36	—	Overcast
S.	15	—.919	31	30	1	Frosty	—.953	39	37	2	Overcast, fine	—.941	25	25	—	Clear & frosty
S.	16	—.788	37	37	—	Overcast	—.681	41	41	—	Ditto	—.900	36	36	—	Cloudy
M.	17	30.042	34	32	2	Clear	30.096	42	42	—	Clear	30 207	30	30	—	Clear & frosty
T.	18	—.353	29	29	—	Hoar frost	—.381	31	31	—	Frosty, foggy	—.399	34	34	—	Overcast
☽ W.	19	—.452	32	32	—	Foggy	—.197	33	33	—	Foggy	—.321	30	30	—	Foggy
Th.	20	—.172	30	30	—	Hazy	—.098	34	34	—	Slight haze	—.028	34	34	—	Do. slight rain
F.	21	—.024	32	32	—	Ditto	—.010	34	34	—	Foggy	—.009	33	33	—	Overcast
S.	22	29.881	33	30	3	Overcast	29 702	34	34	—	Hazy	29.285	39	39	—	Ditto
S.	23	—.220	32	30	2	Clear	—.308	36	36	—	Snowing	—.584	28	28	—	Clear & frosty
M.	24	—.853	25	24	1	Do. & frosty	—.823	34	27	7	Very Fine	—.634	33	29	4	Overcast
T.	25	—.327	35	35	—	Drizzly	—.483	42	42	—	Fine	—.745	28	28	—	Clear
○ W.	26	—.518	38	38	—	Densely Overcast	—.175	43	43	—	Boisterous, rain	—.204	42	42	—	Boisterous
Th.	27	—.638	37	35	2	Very clear	—.700	45	45	—	Very fine	—.794	35	35	—	Overcast
F.	28	—.831	33	33	—	Ditto	—.840	41	41	—	Fine	—.907	32	32	—	Cloudy
S.	29	—.958	31	31	—	Sleet	—.921	40	40	—	Overcast	30.075	36	36	—	Overcast
S.	30	30.219	36	36	—	Cloudy & fine	—.906	40	40	—	Do. & fine	—.209	36	36	—	Ditto
M.	31	—.124	41	41	—	Hazy	30.100	48	48	—	Hazy	29.930	45	45	—	Heavy rain
		29.983	32.31	31.35	0.96		29.944	36.70	34.74	1.96		29.977	33.03	32.58	0.45	

JANUARY.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	38	27	38	22	SE	Brisk	
2	37	25	37	22	NW	Ditto	
3	37	22	39	15	——	Ditto	
4	34	29	35	24	N	Ditto	
5	36	30	37	27	——	Little	
6	37	23	40	16	NE	Brisk	.01
7	35	28	35	23	——	Ditto	
8	34	28	35	24	E	Little	
9	30	27	30	23	NE	Brisk	
10	31	25	31	22	SE	Little	
11	34	30	34	28	S	Ditto	.10
12	36	24	38	20	——	Ditto	
13	33	29	33	27	SE	Ditto	.28
14	36	22	32	19	SW	Ditto	
15	39	20	39	16	——	Ditto	.02
16	42	31	42	28	S	Ditto	.02
17	43	22	44	18	NW	Brisk	
18	33	31	34	27	——	Little	
19	33	27	33	26	SW	Ditto	
20	33	32	33	28	NE	Ditto	
21	35	30	35	28	E	Ditto	
22	38	29	38	26	SE	Ditto	
23	38	18	38	11	NW	Brisk	.12
24	36	23	50	18	W	Little	.12
25	46	35	47	32	NW	Brisk	.10
26	43	21	43	16	S	Strong	.14
27	45	31	50	28	W	Brisk	
28	45	23	48	19	NW	Little	
29	45	36	46	30	SW	Ditto	.03
30	43	32	43	30	W	Ditto	
31	47	30	48	27	SW	Ditto	.12
	37.81	27.09	38.87	23.22			1.06

Remarks.

Although there was no continued severe frost in this month, yet a general low temperature prevailed, the mean being scarcely ½ degree above the freezing point; the average maximum and minimum ranging above and below this only 5 or 6 degrees. The mean height of the barometer was a little above that which it usually averages. Very little rain fell during the first 3 weeks, and the total amount was below the average. Westerly winds were most prevalent.

Snow fell on the 13th, uniformly to the depth of nearly 3 inches. The 26th was boisterous, with rain in the forenoon and snow in the afternoon.

Mean Pressure from the 3 daily observations	29.968 inches.
—— Temperature .... Ditto......	34°.01
—— Dew Point .... Ditto......	32°.89
—— Degree of Dryness ..... Ditto......	1°.12
—— Degree of Moisture .... Ditto......	.961
—— Force of Vapour .... Ditto......	.223 inch.
Least observed degree of Moisture	.730
Maximum Temperature in the Shade	47°.
Minimum Temperature in ditto	18°.
Maximum Temperature in the Sun	50°.
Minimum of Terrestrial Radiation	11°.
Mean Temperature of External Air	32°.45.

Winds.

North...... 2 days	N. East...... 4 days
South...... 4 ..	S. East...... 4 ..
East........ 2 ..	N. West..... 7 ..
West....... 3 ..	S. West...... 5 ..

31 days.

Amount of Rain .... 1.06 inches.

FEBRUARY.

1842.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
T.	1	30.100	40	40	—	Overcast	30.122	50	45	5	Very fine	30.130	31	31	—	Clear
☾ W.	2	—.165	40	40	—	Ditto	—.059	50	43	7	Slightly overcast	—.241	44	44	—	Overcast
Th.	3	—.377	43	43	—	Slight haze	—.397	45	45	—	Thick haze	—.409	40	40	—	Thick haze
F.	4	—.439	40	40	—	Hazy	—.407	45	37	8	Light haze	—.351	33	33	—	Slight haze
S.	5	—.267	37	33	4	Ditto	—.219	36	28	8	Hazy	—.177	33	33	—	Overcast
S.	6	—.109	32	29	3	Dry haze	—.006	38	36	2	Fine	29.892	31	31	—	Clear
M.	7	29.735	34	34	—	Sleet	29.697	39	39	—	Hazy	—.786	34	34	—	Overcast
T.	8	—.816	34	34	—	Foggy	—.786	42	42	—	Foggy	—.813	44	44	—	Foggy
W.	9	—.795	37	37	—	Slightly Overcast	—.755	51	51	—	Fine	—.512	45	45	—	Clear
● Th.	10	—.895	45	45	—	Slight haze	—.947	51	51	—	Overcast	—.986	47	47	—	Densely overcast
F.	11	—.976	48	45	3	Heavy clouds	—.970	52	48	4	Cloudy	—.985	49	49	—	Ditto
S.	12	30.004	50	50	—	Overcast	30.020	50	50	—	Ditto	30.065	50	50	—	Overcast and fine
S.	13	—.180	41	40	1	Clear and Fine	—.020	50	50	—	Showery	—.145	41	41	—	Clear and fine
M.	14	—.390	45	43	2	Fine	—.434	50	44	6	Very fine	—.452	42	42	—	Overcast
T.	15	—.446	45	43	2	Very Fine	—.434	52	49	3	Ditto	—.424	42	42	—	Cloudy & fine
W.	16	—.488	45	45	—	Ditto	—.465	50	48	2	Cloudy & do.	—.416	41	41	—	Ditto
Th.	17	—.372	43	43	—	Foggy	—.336	52	42	10	Ditto	—.252	34	34	—	Clear
☽ F.	18	—.316	35	35	—	Slightly overcast	—.338	43	38	5	Clear and fine	—.367	31	31	—	Ditto
S.	19	—.377	29	29	—	Frosty & foggy	—.346	43	43	—	Hazy	—.194	36	36	—	Overcast
S.	20	—.030	35	35	—	Drizzly	29.975	37	37	—	Drizzly	29.881	37	37	—	Ditto
M.	21	29.771	38	35	3	Overcast	—.790	45	45	—	Cloudy	—.813	32	32	—	Clear
T.	22	—.753	39	39	—	Drizzly	—.688	47	47	—	Ditto	—.616	40	40	—	Cloudy
W.	23	—.444	44	44	—	Thickly overcast	—.330	47	47	—	Ditto	—.167	43	43	—	Rain
Th.	24	—.171	42	42	—	Ditto	—.115	46	44	2	Ditto	—.121	41	41	—	Overcast
○ F.	25	—.180	37	37	—	Cold rain	—.200	44	44	—	Showery	—.250	32	32	—	Cloudy
S.	26	—.367	36	36	—	Ditto showers	—.449	45	35	10	Clear and cool	—.570	35	35	—	Clear
S.	27	—.470	44	44	—	Stormy showers	—.377	42	42	—	Heavy rain	—.377	42	42	—	Densely overcast
M.	28	—.593	40	40	—	Fine	—.629	49	49	—	Overcast	—.388	50	50	—	Do. stormy
		29.968	39.92	39.28	0.64		29.938	46.10	43.53	2.57		29.920	39.28	39.28	0.0	

FEBRUARY.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	46	26	56	23	NW	Little	
2	50	40	51	37	W	Ditto	.02
3	45	37	50	30	NW	Ditto	
4	42	30	45	27	E	Ditto	
5	42	27	43	22	——	Ditto	
6	38	26	40	23	——	Ditto	.06
7	40	31	41	30	——	Ditto	.11
8	46	28	50	25	——	Ditto	.06
9	51	43	62	40	S	Ditto	
10	51	45	52	41	——	Ditto	
11	52	47	55	46	——	Brisk	.14
12	54	30	57	26	——	Ditto	
13	52	28	53	26	——	Ditto	.04
14	52	37	62	33	——	Little	
15	54	40	60	38	SW	Ditto	
16	53	33	56	32	——	Ditto	
17	49	25	49	21	S	Ditto	
18	47	24	48	20	NW	Ditto	
19	49	30	49	25	W	Ditto	.02
20	40	31	40	25	SW	Ditto	
21	48	27	48	23	——	Brisk	.16
22	50	34	52	31	S	Little	
23	50	40	56	38	——	Brisk	.11
24	47	33	47	30	——	Little	.11
25	45	23	59	18	W	Brisk	.07
26	48	30	65	28	——	Ditto	.04
27	44	36	44	33	S	Strong	.05
28	51	42	60	41	——	Brisk	.33
	47.71	32.96	51.78	29.71			1.32

Remarks.

The mean temperature was about the average. The barometer averaged a little higher than usual; and the quantity of rain was somewhat less. South winds were prevalent. It is well known to be very generally the case that south and south-west winds occasion a low state of the barometer; but a remarkable instance of the contrary occurred in the period between the 12th and 17th inclusive, the barometer being then very high, with the wind from south and south-west. It was even brisk from south on the 11th and two following days.

Mean Pressure from the 3 daily observations 29.942 inches.
—— Temperature .... Ditto ...... 41°.76
—— Dew Point .... Ditto ...... 40°.69
—— Degree of Dryness .... Ditto ...... 1°.07
—— Degree of Moisture .. Ditto ...... .996
—— Force of Vapour .... Ditto ...... .288 inch.
Least observed degree of Moisture ...... .710
Maximum Temperature in the Shade .... 54°.
Minimum Temperature in ditto .... 23°.
Maximum Temperature in the Sun ...... 65°.
Minimum of Terrestrial Radiation ...... 18°.
Mean Temperature of External Air ...... 40°.03

Winds.

North ...... 0 days	N. East...... 0 days
South .... 12 ..	S. East....... 0 ..
East......... 5 ..	N. West...... 3 ..
West .... 4 ..	S. West...... 4 ..

28 days.

Amount of Rain................1.32 inches.

MARCH.

1842.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
T.	1	29.226	42	42	—	Showery	29.318	49	49	—	Showery	29.558	39	39	—	Clear
W.	2	—.766	42	42	—	Overcast	—.600	50	50	—	Stormy & wet	—.701	50	50	—	Rain
Th.	3	—.856	52	52	—	Ditto	—.869	56	55	1	Cloudy	—.839	50	50	—	Clear
☾ F.	4	—.950	40	40	—	Ditto	—.957	50	46	4	Overcast	—.918	55	55	—	Cloudy
S.	5	30.008	37	37	—	Clear	30.020	50	42	8	Very Fine	30.036	34	34	—	Clear
S.	6	29.992	33	33	—	Slight Haze	29.835	51	45	6	Ditto	29.813	34	34	—	Ditto
M.	7	—.720	40	40	—	Overcast	—.654	55	43	12	Cloudy	—.477	50	50	—	Overcast
T.	8	—.500	50	50	—	Fine	—.498	47	47	—	Very Fine	—.416	44	44	—	Heavy rain
W.	9	—.600	40	40	—	Ditto	—.606	47	35	—	Stormy, rain	—.152	39	39	—	Stormy ditto
Th.	10	—.463	41	41	—	Boisterous	—.750	50	50	—	Cloudy	—.018	38	35	3	Clear
F.	11	30.040	38	35	3	Densely overcast	—.914	50	50	—	Overcast	—.825	52	52	—	Overcast
● S.	12	—.045	40	40	—	Fine	30.019	55	42	13	Cloudy, Fine	—.938	43	43	—	Clear
S.	13	29.888	46	46	—	Slight rain	—.010	51	38	—	Ditto	30.132	43	43	—	Overcast
M.	14	30.223	46	46	—	Drizzly	—.243	49	49	—	Overcast	—.284	46	46	—	Drizzly
T.	15	—.331	50	50	—	Hazy	—.324	54	54	—	Very Fine	—.332	51	51	—	Very Fine
W.	16	—.316	52	52	—	Ditto	—.268	54	41	13	Overcast	—.138	49	49	—	Overcast
Th.	17	—.131	52	48	4	Fine	—.108	56	50	6	Fine	29.761	47	47	—	Stormy & wet
F.	18	29.739	46	46	—	Ditto	29.707	52	44	8	Cloudy	—.609	43	39	4	Clear
☽ S.	19	—.562	41	36	5	Clear & cold	—.461	46	33	13	Hail showers	—.280	43	41	2	Overcast
S.	20	—.400	43	43	—	Overcast	—.446	48	40	8	Cloudy	—.638	41	41	—	Cloudy
M.	21	—.890	42	42	—	Cold and windy	—.967	44	44	—	Stormy showers	30.157	39	39	—	Rain
T.	22	30.151	39	39	—	Fine, Cloudy	30.052	47	32	15	Cloudy [hail	29.951	36	36	—	Ditto
W.	23	—.102	37	37	—	Very clear	—.112	42	35	7	Cold showers,	30.183	33	33	—	Clear
Th.	24	—.221	39	39	—	Overcast	—.199	46	43	3	Hazy	—.167	42	42	—	Hazy
F.	25	—.130	43	43	—	Ditto	—.027	52	44	8	Cloudy	29.607	45	45	—	Stormy, rain
☉ S.	26	29.629	42	42	—	Clear	29.593	50	39	11	Ditto	—.581	40	40	—	Cloudy
S.	27	—.763	46	39	7	Ditto	—.758	51	37	14	Ditto & fine	—.746	43	43	—	Overcast
M.	28	—.704	50	50	—	Overcast, fine	—.725	60	50	10	Ditto	—.740	50	50	—	Cloudy
T.	29	—.860	53	53	—	Cloudy	—.916	55	45	—	Very Fine	—.921	51	51	—	Ditto
W.	30	—.857	49	47	2	Overcast	—.836	52	52	—	Rain	—.914	46	46	—	Ditto
Th.	31	—.795	48	48	—	Rain	—.613	58	58	—	Cloudy	—.426	54	54	—	Boisterous, rain
		29.866	43.83	43.16	0.67		29.848	50.54	44.58	5.96		29.782	44.51	44.22	0.29	

MARCH.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	51	34	53	30	W	Little	.02
2	52	49	52	48	SW	Brisk	.41
3	57	41	60	38	—	Ditto	.01
4	48	29	65	26	W	Little	
5	54	27	75	21	—	Ditto	
6	54	26	59	22	SE	Ditto	
7	54	46	54	43	S	Brisk	.02
8	57	35	70	32	SW	Little	.17
9	48	37	62	35	—	Brisk	.47
10	47	31	62	24	NW	Ditto	.01
11	50	27	57	24	S	Ditto	
12	58	40	72	36	SW	Little	.06
13	57	37	74	32	W	Brisk	
14	49	45	62	44	S	Little	.02
15	54	46	55	46	SW	Ditto	
16	56	44	58	42	—	Ditto	
17	56	43	61	39	—	Ditto	.05
18	52	35	55	32	W	Brisk	
19	46	40	50	37	SW	Strong	
20	48	38	55	34	NW	Brisk	.10
21	49	34	64	30	N	Ditto	.08
22	48	30	50	25	—	Ditto	.08
23	46	28	56	23	—	Ditto	.03
24	46	34	63	31	W	Little	
25	54	36	63	32	—	Brisk	.07
26	50	29	69	25	NW	Ditto	.01
27	52	41	60	40	W	Ditto	.02
28	60	47	70	46	—	Ditto	
29	59	48	65	47	—	Little	
30	59	42	65	40	SW	Brisk	.05
31	56	43	56	39	—	Strong	.13
	52.48	37.48	61.03	34.29			1.81

Remarks.

About half an inch above the usual quantity of rain fell in this month, but the dryness of the air in intervals was considerable. West and south-west winds were prevalent; and the mean temperature was in consequence 2° above the average. At the end of the month, vegetation was in a very forward state; the common Hawthorn was then in leaf, a fortnight earlier than usual, and a month earlier than in some late seasons.

The 2nd was stormy and wet, with south-west wind, the latter maintaining the temperature at night to within 3° of its maximum through the day. The 9th was stormy with hail showers, followed by very heavy rain, the wind increasing to a hurricane at night.

Mean Pressure from the 3 daily observations 29.821 inches.
—— Temperature .... Ditto ...... 46°.29
—— Dew Point .... Ditto ...... 43°.98
—— Degree of Dryness ... Ditto ...... 2°.31
—— Degree of Moisture .. Ditto ...... .921
—— Force of Vapour ..... Ditto ...... .327 inch.
Least observed degree of Moisture ...... .636
Maximum Temperature in the Shade .... 60°.
Minimum Temperature in ditto .... 26°.
Maximum Temperature in the Sun ...... 75°.
Minimum of Terrestrial Radiation ...... 21°.
Mean Temperature of External Air ..... 44°.98

Winds.

North ...... 3 days	N. East...... 0 days
South ...... 3 ..	S. East...... 1 ..
East .... 0 ..	N. West..... 3 ..
West.......10 ..	S. West .....11 ..

31 days.

Amount of Rain.................. 1.81 inch.

APRIL.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
F.	1	29.308	44	44	—	Cloudy	29.303	49	49	—	Rain	29.457	40	40	—	Slightly Overcast
☾ S.	2	—.576	43	40	3	Ditto	—.667	44	44	—	Ditto	—.780	37	37	—	Clear & cold
S.	3	—.819	38	34	4	Very Clear	—.846	45	35	10	Cloudy & cold	30.012	38	38	—	Ditto
M.	4	30.182	40	30	10	Cold & Dry	30.206	48	33	15	Ditto	—.309	37	37	—	Clear
T.	5	—.355	40	32	8	Clear	—.349	49	29	20	Cold & dry	—.286	35	35	—	Ditto
W.	6	—.188	40	36	4	Ditto	30.061	55	34	21	Dry, with sun	29.957	41	38	3	Ditto
Th.	7	29.858	44	42	2	Overcast	29.800	53	48	5	Ditto	—.907	44	44	—	Densely overcast
F.	8	30.053	45	45	—	Hazy	30.071	40	32	8	Cold & dry	30.190	41	35	6	Clear
S.	9	—.319	42	38	4	Clear	—.307	49	30	19	Clear	—.331	39	36	3	Cloudy
● S.	10	—.355	40	28	12	Slight haze	—.307	46	34	12	Overcast	—.281	43	38	5	Overcast
M.	11	—.216	43	35	8	Light Clouds	—.186	47	47	—	Showers	—.137	37	37	—	Clear
T.	12	—.104	40	26	14	Cold & Dry	—.066	47	35	12	Cold & dry	—.023	39	33	6	Cloudy & cold
W.	13	—.992	42	42	—	Cold rain	29.960	42	42	—	Cloudy & cold	29.957	39	39	—	Rain
Th.	14	—.940	42	42	—	Cloudy	—.943	49	49	—	Showers	30.025	41	36	5	Overcast
F.	15	30.052	46	40	6	Fine	30.062	49	37	12	Bleak & cold	—.068	39	39	—	Clear
S.	16	—.113	46	35	11	Cold & dry	—.121	50	26	24	Clear & cold	—.147	48	35	13	Ditto
☽ S.	17	—.182	46	42	4	Thickly overcast	—.164	48	40	8	Overcast	—.179	43	43	—	Overcast
M.	18	—.091	46	40	6	Ditto	—.193	49	40	9	Ditto	—.201	45	42	3	Ditto & Fine
T.	19	—.199	43	41	2	Hazy	—.177	53	42	11	Dry Haze	—.154	38	38	—	Clear
W.	20	—.150	46	43	3	Light dry haze	—.121	61	43	18	Fine	—.093	46	46	—	Ditto
Th.	21	—.140	47	45	2	Ditto	—.106	57	48	9	Clear & Do.	—.047	48	48	—	Overcast
F.	22	29.994	47	47	—	Foggy	29.944	60	53	7	Dry Haze	29.899	47	47	—	Clear and fine
S.	23	—.897	53	50	3	Fine	—.901	70	52	18	Very Fine	—.878	47	47	—	Ditto
○ S.	24	—.921	60	50	10	Very Fine	—.894	72	59	13	Ditto	—.948	50	50	—	Cloudy
M.	25	30.013	57	52	5	Light haze	30.028	70	45	25	Ditto	—.946	49	49	—	Clear
T.	26	—.055	54	46	8	Very Fine	—.018	63	40	23	Bright sun	30.025	46	46	—	Ditto
W.	27	29.986	51	43	8	Ditto	29.990	60	30	30	Very dry	29.959	49	49	—	Ditto
Th.	28	30.031	54	50	4	Light haze	—.941	69	45	24	Hot and dry	30.050	51	51	—	Ditto
F.	29	—.061	50	43	7	Ditto	—.986	67	60	7	Fine	29.881	51	51	—	Cloudy
S.	30	29.835	55	53	2	Fine	—.800	71	48	23	Dito, very dry	—.835	51	46	5	Clear
		30.035	46.13	41.13	5.00		30.017	54.40	41.63	12.77		30.015	39.96	38.33	1.63	

APRIL.

	Temperature.				Wind.		Rain.	
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In.	Pts.
1	51	32	51	28	N	Little		.02
2	47	31	60	27	——	Brisk		.02
3	47	35	55	32	——	Ditto		
4	47	27	50	20	NE	Ditto		
5	50	23	74	17	——	Little		
6	54	37	56	32	——	Ditto		
7	58	35	65	30	——	Brisk		
8	58	27	80	21	E	Ditto		
9	57	34	70	27	——	Ditto		
10	46	29	52	25	——	Ditto		
11	49	34	52	30	——	Little		.01
12	46	36	50	29	NE	Brisk		
13	47	36	48	34	——	Ditto		.08
14	52	39	55	36	——	Ditto		.01
15	51	36	60	32	——	Ditto		
16	51	31	60	25	——	Ditto		
17	51	41	60	40	——	Ditto		
18	47	40	58	38	——	Little		
19	63	26	69	20	——	Ditto		
20	64	33	70	27	E	Ditto		
21	60	43	65	39	——	Ditto		
22	66	36	70	32	NE	Ditto		
23	75	37	85	32	NW	Ditto		
24	75	37	80	39	SE	Ditto		.01
25	73	42	98	37	E	Ditto		
26	66	39	90	34	——	Brisk		
27	63	31	80	26	——	Ditto		
28	72	35	93	31	SE	Little		
29	71	43	75	39	E	Ditto		
30	74	41	81	34	——	Brisk		
	57.70	34.86	67.06	30.46				0.15

Remarks.

This was a very dry month; in fact the driest of any for the last sixteen years at least. A small quantity of rain fell on the 13th, and only slight depositions on four other days. With the exception of one day, the wind was either from north, or from easterly points throughout the whole of the month. The heat of the sun's rays was considerable; but their effect was greatly counteracted by winds from cold quarters, as above mentioned. Sharp frosts occurred on the nights of the 4th, 5th, 8th, 19th, and even so late as the 27th. These, with the dry cold winds, were unfavourable to vegetation, especially as the latter was rendered susceptible from having been previously far advanced. The 16th was very clear, with Aurora Borealis at night.

Mean Pressure from the 3 daily observations 30.022 inches.
—— Temperature .... Ditto ...... 46°.83
—— Dew Point .... Ditto ...... 40°.36
—— Degree of Dryness ... Ditto ...... 6°.47
—— Degree of Moisture .. Ditto ...... .784
—— Force of Vapour. .... Ditto ...... .284 inch.
Least observed degree of Moisture .... .441
Maximum Temperature in the Shade ...... 75°.
Minimum Temperature in ditto .... 23°.
Maximum Temperature in the Sun ...... 98°.
Minimum of Terrestrial Radiation ...... 17°.
Mean Temperature of External Air ...... 46°.28

WINDS.

North.....	3 days	N. East......	13 days
South	0 ..	S. East.......	2 ..
East	11 ..	N. West.....	1 ..
West.......	0 ..	S. West......	0 ..

30 days.

Amount of Rain.......................... 0.15 inch.

MAY.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.933	58	49	9	Clear and dry	29.939	68	36	32	Clear, very dry	30.007	50	50	—	Clear & fine
☾ M.	2	30.022	55	45	10	Ditto	—.962	65	34	31	Ditto	29.990	45	40	5	Ditto
T.	3	29.967	49	44	5	Very Fine	—.888	67	45	22	Fine	—.854	53	53	—	Cloudy, rain
W.	4	—.907	53	50	3	Light clouds	—.902	61	39	22	Ditto	—.892	48	48	—	Clear & fine
Th.	5	—.886	55	50	5	Ditto	—.777	62	57	5	Cloudy	—.530	52	52	—	Heavy rain
F.	6	—.423	53	53	—	Fine	—.376	58	58	—	Showery	—.410	50	50	—	Cloudy, fine
S.	7	—.322	51	51	—	Rain	—.258	60	60	—	Ditto	—.197	49	49	—	Stormy showers
S.	8	—.382	55	52	3	Cloudy	—.516	49	49	—	Ditto stormy	—.706	57	57	—	Clear
M.	9	—.892	51	45	6	Ditto & Fine	—.968	48	48	—	Showery	30.084	45	45	—	Cloudy
● T.	10	30.172	49	49	—	Clear	30.152	59	40	19	Very Fine	—.068	42	42	—	Clear
W.	11	29.966	58	50	8	Fine	29.905	63	40	23	Ditto	29.842	50	50	—	Cloudy
Th.	12	—.920	47	47	—	Rain	—.951	49	49	—	Drizzly	—.984	49	49	—	Ditto
F.	13	30.033	53	50	3	Slight haze	30.043	64	46	18	Very Fine	30.078	52	52	—	Fine
S.	14	—.138	52	52	—	Ditto	—.170	66	52	14	Ditto	—.230	54	54	—	Clear
S.	15	—.350	55	52	3	Ditto and Fine	—.341	68	54	14	Ditto	—.387	49	49	—	Ditto
M.	16	—.390	59	53	6	Very Fine	—.358	70	55	25	Ditto	—.307	49	49	—	Ditto
☽ T.	17	—.278	52	52	—	Overcast	—.239	62	52	10	Ditto	—.139	49	49	—	Ditto
W.	18	—.046	52	52	—	Ditto	—.000	59	54	5	Do. Overcast	29.911	53	53	—	Overcast
Th.	19	29.807	55	52	3	Cloudy & Fine	29.748	62	55	7	Densely overcast	—.711	45	45	—	Clear
F.	20	—.647	55	52	3	Densely clouded	—.646	59	50	9	Cloudy	—.658	52	52	—	Overcast
S.	21	—.676	61	55	6	Cloudy & Fine	—.692	66	50	16	Do. & Fine	—.724	51	51	—	Cloudy
S.	22	—.748	58	55	3	Ditto	—.674	61	56	5	Ditto	—.727	52	52	—	Slight Rain
M.	23	—.785	59	50	9	Ditto	—.812	65	44	21	Ditto	—.857	49	41	8	Cloudy
○ T.	24	—.838	54	54	—	Rain	—.825	60	60	—	Rain	—.790	48	48	—	Clear
W.	25	—.847	56	56	—	Ditto	—.854	60	58	2	Cloudy	—.845	52	50	2	Overcast
Th.	26	—.767	56	56	—	Ditto	—.772	62	60	2	Ditto	—.823	52	52	—	Clear
F.	27	—.929	57	56	1	Cloudy & Fine	—.937	67	57	10	Do. & Fine	—.911	59	59	—	Overcast
S.	28	—.988	57	57	—	Overcast	30.018	64	45	19	Very Fine	30.066	53	53	—	Clear
S.	29	30.124	62	55	7	Clear & Fine	—.046	70	48	22	Clear & Do.	29.991	60	56	4	Ditto
M.	30	29.955	63	53	—	Very Fine	29.965	70	55	15	Ditto	30.050	54	48	6	Ditto
T.	31	30.118	60	50	10	Ditto	30.126	70	44	26	Fine	—.155	56	56	—	Cloudy
		29.911	55.16	51.51	3.64		29.898	62.38	49.67	12.71		29.900	50.93	50.12	0.81	

MAY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	73	44	80	40	W	Brisk	
2	66	30	73	24	NE	Ditto	
3	71	46	81	42	NW	Little	.02
4	65	33	74	25	N	Ditto	
5	63	46	75	43	S	Brisk	.16
6	60	47	66	42	W	Ditto	.12
7	63	46	67	43	SW	Strong	.22
8	63	41	71	38	W	Brisk	.20
9	60	32	70	26	N	Ditto	.10
10	64	35	75	29	NW	Little	
11	65	44	76	40	S	Brisk	.26
12	51	37	52	31	N	Little	.02
13	70	36	80	29	NW	Ditto	
14	72	38	80	36	W	Ditto	
15	67	36	73	31	NE	Ditto	
16	68	42	74	37	——	Ditto	
17	68	43	71	36	——	Ditto	
18	69	40	76	34	——	Ditto	
19	65	36	78	29	SW	Ditto	.04
20	63	49	73	45	——	Brisk	
21	61	41	68	38	S	Little	
22	65	42	73	36	——	Brisk	.01
23	64	43	73	39	——	Little	.01
24	65	40	74	36	SW	Ditto	.20
25	63	48	71	46	——	Brisk	.23
26	66	47	72	42	——	Ditto	.01
27	68	51	75	49	S	Little	.13
28	70	41	80	34	W	Ditto	
29	71	46	80	41	S	Ditto	
30	73	46	83	41	W	Ditto	
31	73	41	84	38	NW	Ditto	
	65.97	41.52	72.51	36.77			1.73

Remarks.

This month was more favourable than the preceding for vegetation, with the exception of a frost on the night of the 2nd. This frost affected the late blossoming kinds of fruit trees to some injurious extent, the young fruit, where set, being at the same time tolerably safe. Rain was much wanted; and a moderate supply fell in the course of the month. The mean temperature was about 1½ deg. below the average. On the 1st and 2nd the air was clear and excessively dry.

Mean Pressure from the 3 daily observations	29.903 inches
—— Temperature ....Ditto...	56°.15
—— Dew Point ....Ditto...	50°.43
—— Degree of Dryness..........Ditto...	5°.72
—— Degree of Moisture ....Ditto...	.896
—— Force of Vapour ....Ditto...	.407 inch.
Least observed degree of Moisture	.427
Maximum Temperature in the Shade	73°.
Minimum Temperature in ditto	30°.
Maximum Temperature in the Sun	84°.
Minimum of Terrestrial Radiation	24°.
Mean Temperature of External Air	53°.73

WINDS.

North......	3 days	N. East	5 days
South......	7 ..	S. East	0 ..
East	0 ..	N.West	4 ..
West.......	6 ..	S. West	6 ..

31 days.

Amount of Rain ....1.73 inch.

JUNE.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
☾ W.	1	30.211	65	53	12	Very Fine	30.171	74	52	22	Fine	30.125	60	55	5	Cloudy
Th.	2	—.169	68	62	6	Overcast	—.216	71	53	18	Very Fine	—.265	54	51	3	Clear & Fine
F.	3	—.296	62	45	17	Cloudless	—.218	74	50	24	Ditto	—.160	58	53	5	Ditto
S.	4	—.112	63	53	10	Ditto	—.034	79	49	30	Hot & Dry	29.965	60	57	3	Ditto
S.	5	29.953	70	54	16	Fine, lt. clouds	29.905	81	53	28	Ditto	—.809	60	59	1	Cloudy
M.	6	—.915	68	63	5	Do. dry haze	—.945	78	55	23	Ditto	30.038	60	58	2	Ditto
T.	7	30.167	66	59	7	Fine	30.163	73	53	20	Ditto	—.217	61	61	—	Clear & Fine
● W.	8	—.244	69	63	6	Ditto	—.204	80	65	15	Ditto	—.221	62	62	—	Ditto
Th.	9	—.218	64	55	9	Ditto	—.165	75	61	14	Ditto	—.103	64	60	4	Ditto
F.	10	—.100	67	57	10	Clear	—.064	79	55	24	Ditto	—.083	65	61	4	Ditto
S.	11	—.133	69	64	5	Very Fine	—.150	85	70	15	Ditto	—.180	65	65	—	Ditto
S.	12	—.263	69	65	4	Clear & Hot	—.244	85	60	25	Ditto	—.256	67	62	5	Ditto
M.	13	—.293	66	60	6	Ditto	—.217	81	55	26	Ditto	—.153	65	62	3	Cloudy
T.	14	—.094	71	65	6	Hot & dry	—.028	85	65	20	Ditto	—.012	67	64	3	Do. very fine
☽ W.	15	—.039	64	58	6	Fine	—.048	75	57	18	Fine, light clouds	29.989	67	63	4	Ditto
Th.	16	29.989	65	56	9	Ditto	29.995	71	57	14	Overcast	—.992	63	60	3	Ditto
F.	17	30.062	68	54	14	Fine, but dry	30.058	67	55	12	Ditto	30.084	58	55	3	Ditto
S.	18	—.041	64	51	13	Slightly Over-	29.971	63	63	—	Heavy showers	29.888	57	57	—	Showers
S.	19	29.769	62	62	—	Heavy rain [cast	—.688	68	68	—	Cloudy	—.691	57	57	—	Cloudy
M.	20	—.734	65	65	—	Cloudy	—.665	72	68	4	Ditto & Fine	—.682	57	57	—	Ditto
T.	21	—.640	67	65	2	Ditto	—.650	73	73	—	Slight Rain	—.670	57	57	—	Ditto
○ W.	22	—.767	65	57	8	Very Fine	—.725	71	50	21	Cloudy	—.737	56	56	—	Cloudy
Th.	23	—.823	61	55	6	Ditto	—.820	71	48	23	Very Fine	—.767	59	59	—	Overcast
F.	24	—.679	62	62	—	Slight rain	—.654	73	67	6	Cloudy, Ditto	—.420	59	59	—	Ditto
S.	25	—.806	62	60	2	Overcast	—.753	70	66	4	Cloudy, windy	—.585	60	60	—	Boisterous, rain
S.	26	—.674	61	56	5	Fine	—.735	66	47	19	Ditto	—.915	67	55	12	Clear & dry
M.	27	30.143	62	52	10	Clear	30.197	70	47	23	Fine	30.213	58	53	5	Clear, Fine
T.	28	—.274	65	56	9	Ditto	—.201	76	56	20	Ditto	—.128	65	60	5	Ditto
W.	29	—.078	68	60	8	Fine	—.044	76	54	22	Hot & Dry	29.989	67	62	5	Ditto
☾ Th.	30	29.933	66	66	—	Slight rain	29.871	71	71	—	Overcast	—.791	60	60	—	Rain
		30.013	65.47	58.44	7.03		29.993	74.43	58.10	16.33		29.970	61.16	58.66	2.50	

JUNE.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	76	56	86	53	SW	Brisk	
2	73	41	83	35	NW	Little	
3	76	42	90	38	——	Ditto	
4	82	48	94	40	W	Ditto	
5	80	48	90	43	E	Ditto	
6	82	41	95	48	——	Ditto	
7	78	51	95	48	NE	Ditto	
8	81	47	95	40	——	Brisk	
9	76	49	86	44	——	Little	
10	81	51	98	46	——	Ditto	
11	89	54	106	51	——	Ditto	
12	90	51	108	45	SE	Ditto	
13	90	55	106	49	NE	Ditto	
14	88	53	110	49	SW	Ditto	
15	80	48	102	49	NE	Ditto	
16	76	48	98	45	NW	Ditto	
17	73	51	99	46	E	Ditto	
18	71	49	99	45	S	Ditto	.12
19	71	49	85	47	W	Ditto	.34
20	72	52	90	48	S	Ditto	.01
21	73	51	91	49	SW	Ditto	.01
22	75	48	100	45	W	Ditto	.20
23	73	57	92	53	——	Ditto	.01
24	72	54	85	50	SW	Brisk	
25	66	54	72	53	——	Strong	.09
26	70	49	86	45	——	Brisk	
27	73	44	93	38	W	Ditto	
28	80	51	104	47	SW	Little	
29	82	52	105	46	W	Brisk	
30	71	50	105	50	NE	Little	.80
	77.33	49.80	94.93	41.50			1.58

Remarks.

This was the hottest June since 1826. That was also a dry month; and no rain fell in the present till the 18th. The mean temperature was nearly 3° above the average, fully equalling the usual temperature of July. On 12 days the thermometer indicated as high as 80°, or between that and 90° in the shade. It was 89° on the 11th and 90° on the two following days, although north-east winds were prevalent at the time. The temperature was lowered by the rain; but towards the end of the month it again reached above 80° in the shade. Vegetation was much checked by the drought; but it started most luxuriantly when rain began to fall, there being a great heat in the ground.

Mean Pressure from the 3 daily observations	29.992 inches.
—— Temperature .... Ditto	67°.02
—— Dew Point .... Ditto	58°.40
—— Degree of Dryness ... Ditto	8°.62
—— Degree of Moisture .. Ditto	·752
—— Force of Vapour ..... Ditto	·526 inch.
Least observed degree of Moisture	·435
Maximum Temperature in the Shade.....	90°.
Minimum Temperature in ditto	41°.
Maximum Temperature in the Sun	110°.
Minimum of Terrestrial Radiation	35°.
Mean Temperature of External Air	63°.56

WINDS.

North.......0 days	N. East......8 days
South ....2 ..	S. East ......1 ..
East ....3 ..	N. West.....3 ..
West ....6 ..	S. West......7 ..

30 days.

Amount of Rain............ 1.58 inch.

JULY.

1842.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
F.	1	29.737	52	52	—	Heavy Rain	29.849	65	57	8	Fine	29.835	61	58	3	Cloudy, Fine
S.	2	—.848	60	58	2	Very Fine	—.839	67	50	17	Ditto	—.830	57	56	1	Ditto
S.	3	—.961	61	57	4	Ditto [cast	—.903	70	65	5	Cloudy & Do.	—.826	57	57	—	Overcast
M.	4	—.770	64	64	—	Thickly over-	—.713	75	70	5	Ditto	—.626	63	63	—	Ditto
T.	5	—.652	66	55	11	Dry & windy	—.680	68	68	—	Showery	—.823	54	54	—	Clear & Fine
W.	6	30.103	60	55	5	Clear & Fine	30.104	66	54	12	Very Fine	30.161	54	54	—	Ditto
Th.	7	—.009	61	57	4	Overcast	—.006	62	62	—	Rain	29.826	58	58	—	Overcast
● F.	8	29.804	61	56	5	Slightly Do.	29.740	65	58	7	Cloudy	—.612	57	57	—	Very Heavy rain
S.	9	—.700	61	55	6	Ditto	—.712	71	60	11	Do. & Fine	—.686	55	55	—	Overcast
S.	10	—.880	60	56	4	Clear & Fine	—.894	70	55	15	Ditto	—.864	57	54	3	C oudy, Fine
M.	11	—.642	69	65	4	Cloudy & Do.	—.611	78	63	15	Fine	—.869	63	63	—	Overcast
T.	12	—.832	63	60	3	Very Fine	—.915	72	55	17	Cloudy	30.026	52	52	—	Clear
W.	13	30.147	70	63	7	Cloudy, Fine	30.143	73	66	7	Overcast	—.232	59	59	—	Do. & Fine
☽ Th.	14	—.300	68	61	7	Fine	—.327	70	50	20	Cloudy, Fine	—.337	59	57	2	Cloudy
F.	15	—.388	64	50	14	Very dry	—.323	72	52	20	Dry haze	—.252	58	57	1	Clear
S.	16	—.175	64	55	9	Fine	—.098	71	50	21	Clear & Dry	—.003	58	56	2	Ditto
S.	17	29.894	66	62	4	Ditto	29.837	70	62	8	Light haze	26.789	61	60	1	Cloudy & Fine
M.	18	—.822	67	64	3	Ditto	—.993	79	57	12	Sultry	—.867	62	62	—	Ditto
T.	19	—.842	65	65	—	Slight Rain	—.812	71	71	—	Overcast	—.754	61	61	—	Ditto
W.	20	—.735	64	60	4	Fine	—.712	66	66	—	Showers	—.690	59	59	—	Ditto
Th.	21	—.718	63	63	—	Overcast	—.764	61	61	—	Densely overcast	—.864	52	52	—	Clear
○ F.	22	—.965	57	46	11	Fine	30.027	63	53	10	Cloudy	30.128	52	52	—	Ditto
S.	23	30.196	58	46	12	Very Fine	—.197	67	50	17	Fine	—.153	55	55	—	Ditto
S.	24	—.118	62	57	5	Cloudless	—.039	77	52	25	Clear	29.927	58	58	—	Ditto
M.	25	29.902	61	60	1	Fine	29.890	73	66	7	Fine	—.812	58	58	—	Ditto
T.	26	—.967	62	56	6	Clear	—.984	73	51	22	Ditto [cast	30.066	57	57	—	Ditto [rain
W.	27	30.151	58	58	—	Slight Rain	30.156	70	62	8	Slightly over-	—.106	58	58	—	Lightning,
Th.	28	—.055	66	66	—	Slightly overcast	—.013	72	62	10	Sultry	29.896	59	59	—	Cloudy
F.	29	29.851	56	56	—	Overcast	29.873	66	52	14	Cloudy	—.987	50	50	—	Clear
☾ S.	30	30 018	56	48	8	Cloudy & cool	30.025	64	50	14	Ditto & Fine	30.064	52	52	—	Overcast
S.	31	—.127	59	53	6	Overcast	—.133	58	54	4	Ditto	—.224	55	55	—	Clear
		29.941	62.39	57.71	4.68		29.945	69.29	58.29	11.00		29.936	57.12	56.70	0.41	

JULY.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	70	50	86	47	W	Little	.05
2	69	46	86	42	——	Brisk	
3	75	55	89	54	——	Little	.01
4	76	59	91	56	SW	Brisk	
5	70	46	90	42	W	Ditto	.11
6	72	40	90	33	——	Little	
7	62	50	70	47	S	Ditto	.09
8	66	48	90	46	SW	Brisk	.43
9	72	49	91	46	W	Ditto	.03
10	73	50	92	47	SW	Ditto	
11	78	53	95	50	——	Ditto	.02
12	75	49	100	46	——	Ditto	
13	73	48	100	44	——	Ditto	
14	76	45	100	42	W	Ditto	
15	74	46	90	41	NE	Little	
16	75	55	99	51	E	Brisk	
17	75	52	105	48	——	Ditto	
18	81	57	106	55	SW	Ditto	.02
19	73	52	105	50	SE	Little	.01
20	73	50	90	49	S	Ditto	.12
21	65	47	73	41	N	Ditto	
22	66	46	78	40	——	Ditto	.02
23	70	42	90	36	——	Ditto	
24	84	49	107	44	NE	Ditto	
25	77	43	95	39	E	Brisk	
26	73	48	95	45	——	Little	.02
27	75	55	100	51	SE	Ditto	.56
28	75	55	99	49	NW	Ditto	.03
29	65	45	78	39	N	Ditto	
30	65	52	75	45	——	Ditto	
31	68	47	75	42	——	Ditto	
	72.29	49.32	91.29	46.67			1.52

Remarks.

It was remarked that in the preceding month the mean temperature was so much higher than usual, that it more than equalled the average of July. In the present month the temperature, on the contrary, was so much lower than usual as to correspond with the usual mean of June. The amount of rain was nearly an inch below the average.

The 4th was boisterous at night; the 20th was showery, with lightning at night. Lightning and rain occurred likewise on the night of the 27th. Early on the morning of the 28th, there was much thunder, lightning and rain; the storm became most violent between 5 and 6 A.M.

Mean Pressure from the 3 daily observations 29.941 inches.
—— Temperature ....Ditto....... 62°.93
—— Dew Point ....Ditto....... 57°.57
—— Degree of Dryness ....Ditto....... 5°.36
—— Degree of Moisture....Ditto....... .848
—— Force of Vapour......Ditto....... .518 inch.
Least observed degree of Moisture........ .443
Maximum Temperature in the Shade ..... 84°.
Minimum Temperature in Ditto.......... 40°.
Maximum Temperature in the Sun ..... 107°.
Minimum of Terrestrial Radiation ...... 33°.
Mean Temperature of External Air....... 60°.80

WINDS.

North......6 days	N. East ....2 days
South ......2 ..	S. East.....2 ..
East ....4 ..	N. West....1 ..
West ......7 ..	S. West ....7 ..

31 days.

Amount of Rain .... 1.52 inch.

AUGUST.

			Morning.					Noon.					Night.				
	1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
	M.	1	30.277	59	56	3	Overcast	30.263	70	54	16	Very Fine	30.218	55	55	—	Clear & Fine
	T.	2	—.183	62	57	5	Do. light haze	—.094	74	60	14	Sultry	29.979	58	58	—	Ditto
	W.	3	29.950	67	65	2	Do. and sultry	29.916	82	67	15	Very Fine	—.889	64	64	—	Ditto
	Th.	4	—.856	71	66	5	Very Fine	—.828	84	62	22	Sultry	—.902	63	63	—	Ditto
	F.	5	—.928	69	66	3	Overcast	—.930	76	70	6	Cloudy, Fine	—.904	64	64	—	Cloudy, Fine
●	S.	6	—.844	70	70	—	Cloudy	—.918	70	70	—	Rain	—.937	58	58	—	Clear, Fine
	S.	7	—.859	65	58	7	Very Fine	—.940	76	60	16	Clear	—.963	60	60	—	Ditto
	M.	8	30.025	65	65	—	Clear	30.026	79	60	19	Hot and Dry	30.029	59	59	—	Ditto
	T.	9	—.029	71	65	6	Ditto	29.957	82	60	22	Ditto	29.884	64	64	—	Ditto [der
	W.	10	29.737	81	69	12	Sultry	—.620	89	59	30	Ditto	—.772	66	66	—	Heavy rain, thun-
	Th.	11	—.832	64	64	—	Cloudy	30.024	68	52	16	Clear & Fine	30.131	58	58	—	Clear & Fine
	F.	12	30.257	67	63	4	Clear, very fine	—.254	76	65	11	Very Fine	—.200	59	59	—	Ditto
☽	S.	13	—.379	67	67	—	Hazy	—.399	77	72	5	Overcast	—.395	59	59	—	Ditto
	S.	14	—.359	73	66	7	Very Fine	—.342	81	70	11	Sultry	—.214	61	61	—	Ditto
	M.	15	—.204	70	68	2	Ditto	—.157	85	65	20	Very hot	—.153	66	66	—	Ditto
	T.	16	—.162	71	65	6	Ditto	—.149	85	60	25	Ditto	.130	64	64	—	Ditto
	W.	17	—.112	66	65	1	Slight haze	—.072	77	70	7	Ditto	—.092	64	64	—	Ditto [ning
	Th.	18	29.939	70	70	—	Do. heavy dew	29.902	88	71	17	Ditto	29.830	73	65	8	Cloudy, light-
	F.	19	—.896	69	67	2	Overcast	—.901	75	75	—	Cloudy	—.879	62	62	—	Clear, very fine
	S.	20	—.981	67	63	4	Ditto	—.993	70	62	8	Ditto & Fine	30.038	60	60	—	Ditto
☉	S.	21	—.981	68	61	7	Very Fine	—.943	70	60	10	Ditto	29.943	59	59	—	Ditto
	M.	22	—.929	69	58	11	Ditto	—.913	81	61	20	Hot & Dry	—.926	65	65	—	Ditto
	T.	23	—.888	70	66	4	Cloudless	—.869	82	67	15	Ditto	—.879	57	57	—	Ditto
	W.	24	—.840	62	60	2	Fine	—.777	67	45	22	Ditto [cast	—.725	59	59	—	Rain
	Th.	25	—.702	61	61	—	Overcast	—.698	68	68	—	Densely over-	—.725	63	63	—	Cloudy
	F.	26	—.916	65	65	—	Hazy	—.818	76	60	16	Sultry	—.884	60	60	—	Clear & Fine
	S.	27	—.940	66	63	3	Overcast	—.936	72	63	9	Cloudy, fine	—.933	63	63	—	Ditto
	S.	28	—.977	62	62	—	Rain	—.976	70	69	1	Ditto	—.977	62	62	—	Ditto
☾	M.	29	—.957	63	63	—	Cloudy	—.959	74	70	4	Slight haze	—.956	59	59	—	Ditto
	T.	30	30.007	63	63	—	Foggy	30.003	69	69	—	Hazy	30.011	56	56	—	Overcast
	S.	31	—.137	57	54	3	Clear	—.147	61	48	13	Fine	—.151	53	53	—	Clear & Fine
			30.002	66.77	63.58	3.19		29.991	73.67	61.09	12.58		29.988	61.38	61.12	0.26	

AUGUST.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.	Remarks.
1	72	43	80	38	NE	Little		
2	79	55	92	50	E	Ditto		
3	83	52	100	50	NE	Ditto		
4	86	62	100	57	W	Ditto		
5	70	59	90	55	SW	Ditto		
6	72	53	90	49	W	Ditto		
7	78	48	90	44	SW	Ditto		
8	82	51	98	45	S	Ditto	.15	
9	86	55	100	49	——	Brisk		
10	93	60	110	55	SE	Little	1.06	
11	71	47	90	42	W	Brisk		
12	78	55	92	52	SW	Ditto		
13	73	56	80	53	——	Little		
14	85	48	90	52	NE	Ditto		
15	92	52	105	46	E	Ditto		
16	89	57	106	52	——	Ditto		
17	80	58	102	55	——	Brisk		
18	92	62	120	58	——	Little	.01	
19	73	61	90	57	SW	Ditto	.01	
20	73	57	89	52	W	Ditto		
21	77	55	110	51	SW	Ditto		
22	83	58	115	53	E	Ditto		
23	85	46	120	40	S	Ditto		
24	70	55	96	54	NE	Ditto	.22	
25	71	57	75	55	N	Ditto	.28	
26	80	56	118	53	E	Ditto		
27	74	57	110	53	NE	Ditto	.20	
28	72	56	100	54	——	Ditto	.14	
29	74	55	90	50	——	Ditto	.52	
30	70	46	92	41	W	Ditto		
31	64	50	80	45	NW	Ditto	.22	
	78.29	54.25	97.41	50.32			2.81	

Remarks.

This month was excessively hot, the temperature exceeding that of any corresponding month for at least 16 years previous. The maximum temperature in the shade averaged nearly 80°. On the 10th, with a very dry state of the air, the thermometer indicated 93° in the shade, and on the 15th and 18th, 92°. The excessively hot and dry condition of the air on the 10th was followed by slight rain, with distant thunder in the afternoon, and a heavy thunder storm towards midnight, with rain in torrents, more than an inch having fallen. The 24th and 25th were hot and sultry with thunder, lightning, and rain at nights. On the 29th heavy thunders commenced early, A. M. followed by bright sunshine with a few large drops of rain occasionally; and a violent thunder storm with heavy rain in the afternoon.

Mean Pressure from the 3 daily observations 29.993 inches.
—— Temperature........Ditto...... 67°.27
—— Dew Point..........Ditto...... 61°.93
—— Degree of Dryness....Ditto...... 5°.34
—— Degree of Moisture...Ditto...... .839
—— Force of Vapour.....Ditto...... .592 inch.
Least observed degree of Moisture...... .453
Maximum Temperature in the Shade.... 93°.
Minimum Temperature in ditto........ 43°.
Maximum Temperature in the Sun .... .120°.
Minimum of Terrestrial Radiation ..... 38°.
Mean Temperature of External Air ..... 66°.27

WINDS.

North ...... 1 days	N. East..... 7 days
South .... 3 ..	S. East...... 1 ..
East........ 7 ..	N. West .... 1 ..
West....... 5 ..	S. West..... 6 ..

31 days.

Amount of Rain .... 2.81 inches.

SEPTEMBER.

Morning.							Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
Th.	1	30.003	56	56	—	Rain	29.902	63	63	—	Rain	29.967	65	65	—	Densely Overcast
F.	2	—.075	69	69	—	Overcast	30.124	75	75	—	Sultry	30.175	67	65	2	Clear
S.	3	—.202	62	62	—	Fine	—.203	69	69	—	Overcast	—.153	62	62	—	Ditto
● S.	4	—.193	64	64	—	Overcast	—.193	70	60	10	Very Fine	—.197	54	54	—	Ditto
M.	5	—.196	61	61	—	Foggy	—.151	71	62	9	Cloudy	—.036	54	54	—	Ditto
T.	6	29.942	60	60	—	Fine	—.025	70	60	10	Very Fine	29.905	54	54	—	Ditto
W.	7	—.866	56	56	—	Slight Fog	29.758	71	60	11	Overcast [rain	—.427	62	62	—	Thunder and lightning, with heavy Rain
Th.	8	—.396	63	60	3	Boisterous	—.408	55	55	—	Boisterous,	—.616	54	54	—	Clear
F.	9	—.527	59	59	—	Rain	—.492	65	65	—	Cloudy	— 427	58	58	—	Ditto
S.	10	—.385	60	60	—	Cloudy	—.473	62	59	3	Showers	—.577	55	55	—	Ditto
☽ S.	11	—.676	59	57	2	Do. & Fine	—.655	65	60	5	Cloudy & fine	—.683	57	57	—	Overcast
M.	12	—.788	58	56	2	Fine	—.818	64	58	6	Very Fine	—.930	55	55	—	Cloudy
T.	13	30.071	56	56	—	Ditto	30.085	67	55	12	Ditto	30.126	55	55	—	Overcast
W.	14	—.162	63	63	—	Ditto	—.167	70	65	5	Ditto	—.149	55	55	—	Clear
Th.	15	—.144	65	63	2	Hazy Clouds	—.103	70	60	10	Ditto	—.101	54	54	—	Ditto
F.	16	—.087	56	56	—	Foggy	—.038	69	65	4	Light haze	29.918	53	53	—	Ditto
S.	17	29.787	67	67	—	Fine	29.736	61	58	3	Cloudy	—.720	61	61	—	Overcast
S.	18	—.757	59	59	—	Cloudy [clear	— 644	61	58	3	Overcast	—.611	55	55	—	Ditto
○ M.	19	—.583	55	55	—	Heavy dew,	—.545	65	57	8	Very Fine	—.543	52	52	—	Ditto
T.	20	—.522	53	53	—	Clear	—.484	60	60	—	Showers	—.478	48	48	—	Clear
W.	21	—.464	51	51	—	Fine	—.458	61	60	1	Fine	—.459	46	46	—	Ditto
Th.	22	—.484	48	48	—	Foggy	—.460	61	53	8	Cloudy	—.494	51	51	—	Cloudy
F.	23	—.494	49	49	—	Overcast	—.447	59	59	—	Rain	—.346	53	53	—	Heavy rain
S.	24	—.341	55	55	—	Rain	—.382	56	56	—	Overcast	—.424	54	54	—	Overcast
S.	25	—.536	56	56	—	Cloudy	—.538	62	59	3	Cloudy, fine	—.642	53	53	—	Boisterous, rain
M.	26	—.795	57	57	—	Heavy showers	—.834	60	60	—	Heavy showers	—.906	52	52	—	Clear
☾ T.	27	—.892	54	54	—	Overcast	—.859	51	51	—	Rain	—.929	51	51	—	Cloudy
W.	28	30.047	54	54	—	Cloudy	30.053	57	47	10	Fine	30.059	49	49	—	Clear
Th.	29	—049	52	52	—	Fine	—.026	59	52	7	Clear	—.093	52	52	—	Cloudy
F.	30	—.150	49	45	4	Clear	—.142	56	40	16	Ditto	—.138	48	48	—	Overcast
		29.821	57.53	57.10	0.43		29.806	63.50	58.70	4.80		29.807	54.70	54.65	0.07	

SEPTEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	66	58	66	58	SW	Little	.46
2	81	58	105	55	W	Ditto	
3	74	53	90	51	——	Ditto	
4	74	49	89	43	NW	Ditto	.01
5	74	47	104	43	S	Ditto	
6	73	46	100	41	W	Ditto	
7	73	58	98	57	E	Ditto	.55
8	62	51	62	49	SW	Strong	64
9	66	53	82	51	——	Little	.06
10	66	51	88	47	W	Ditto	.07
11	67	53	87	49	——	Ditto	
12	68	45	82	40	N	Ditto	
13	68	51	102	45	NE	Ditto	
14	72	53	105	48	——	Ditto	
15	74	45	108	40	E	Ditto	
16	72	48	100	45	——	Ditto	
17	74	51	80	50	——	Ditto	.29
18	62	48	80	44	SE	Ditto	.10
19	68	39	100	35	S	Brisk	.08
20	63	40	102	35	SW	Little	.02
21	65	38	100	34	——	Ditto	.02
22	60	42	89	38	W	Ditto	.01
23	56	47	65	45	NW	Ditto	.36
24	59	52	64	50	NE	Ditto	.06
25	62	51	68	49	——	Strong	.26
26	62	49	68	46	E	Brisk	.08
27	58	49	61	45	NE	Ditto	.27
28	58	48	62	45	——	Ditto	
29	58	45	62	41	——	Strong	.04
30	57	44	70	40	——	Brisk	.01
	66.40	48.73	84.63	45.63			3.39

Remarks.

This was rather a wet month. An average temperature was however fully maintained. On the 1st there was constant rain, with southwest wind, the temperature rising instead of falling towards night; and on the following day the thermometer indicated 81° in the shade. On the 7th a violent thunder storm occurred between 7 and 10 P.M. with much sleet and occasionally forked lightning, heavy rain and some hail.

In consequence of the heat and moisture in this month, many kinds of vegetation previously checked had now a tendency to grow rather than mature their wood and fruit. Thus apples and pears were checked in their earlier stage of growth; and they increased considerably in size in this month, when they ought to have ripened off.

Mean Pressure from the 3 daily observations 29.811 inches.
—— Temperature .... Ditto ...... 58°.58
—— Dew Point .... Ditto ...... 56°.81
—— Degree of Dryness .... Ditto ...... 1°.77
—— Degree of Moisture .. Ditto ...... .942
—— Force of Vapour ..... Ditto ...... .504 inch.
Least observed degree of Moisture ...... .665
Maximum Temperature in the Shade .... 81°.
Minimum Temperature in ditto .... 38°.
Maximum Temperature in the Sun ...... 108°.
Minimum of Terrestrial Radiation ...... 34°.
Mean Temperature of External Air ..... 57°.56

Winds.

North...... 1 days	N. East ....8 days
South.......2 ..	S. East .... 1 ..
East........5 ..	N. West....2 ..
West ...... 6 ..	S. West ....5 ..

30 days.

Amount of Rain.................3.39 inches.

OCTOBER.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	30.200	49	49	—	Clear	30.227	58	52	6	Fine	30.275	41	41	—	Clear
S.	2	—.300	42	42	—	Foggy	—.222	59	46	13	Ditto	—.149	42	42	—	Ditto
M.	3	—.089	44	44	—	Ditto	—.033	61	51	10	Overcast	—.010	50	50	—	Overcast
● T.	4	—.052	46	46	—	Fine	—.056	57	44	13	Very Fine	—.123	41	41	—	Clear
W.	5	—.190	38	38	—	Clear	—.192	54	40	14	Do. cloudless	—.238	37	37	—	Ditto & Fine
Th.	6	—.288	43	43	—	Light clouds	—.250	60	49	11	Cloudy, Fine	—.279	51	51	—	Overcast
F.	7	—.280	46	46	—	Fine	—.298	61	54	7	Overcast & fine	—.258	55	55	—	Ditto
S.	8	—.348	54	52	2	Ditto	—.387	60	51	9	Cloudy ditto	—.436	50	50	—	Clear
S.	9	—.490	50	50	—	Light haze	—.449	58	50	8	Ditto	—.447	52	52	—	Overcast
M.	10	—.451	54	50	4	Slightly overcast	—.410	60	52	8	Overcast	—.386	51	51	—	Ditto and fine
☽ T.	11	—.363	42	42	—	Foggy	—.288	60	52	8	Clear, very fine	—.282	54	54	—	Ditto
W.	12	—.286	50	50	—	Overcast	—.258	55	53	2	Cloudy	—.244	52	52	—	Ditto
Th.	13	—.253	53	48	5	Lightly Do.	—.220	57	48	9	Overcast	—.258	41	41	—	Clear and Do.
F.	14	—.208	44	44	—	Hazy	—.204	54	50	4	Hazy	—.209	49	49	—	Overcast & Do.
S.	15	—.263	49	49	—	Ditto	—.249	58	46	12	Overcast	—.233	50	50	—	Ditto
S.	16	—.235	50	50	—	Light haze	—.207	57	48	9	Very Fine	—.171	51	51	—	Ditto
M.	17	—.045	50	50	—	Hazy	29.933	54	50	4	Overcast	29.664	50	50	—	Ditto
T.	18	29.465	50	48	2	Fine	—.351	55	50	5	Very fine	—.202	43	43	—	Heavy Rain
⊙ W.	19	—.250	41	41	—	Cloudy	—.361	47	40	7	Fine	—.518	36	36	—	Clear
Th.	20	—.647	32	32	—	Clear & frosty	—.661	47	39	8	Ditto	—.739	30	30	—	Ditto & frosty
F.	21	—.883	28	28	—	Sharp frost	—.914	45	45	—	Ditto	—.980	28	28	—	Ditto
S.	22	—.726	37	37	—	Densely Overcast	—.437	43	43	—	Heavy rain	—.025	41	41	—	Cloudy
S.	23	28.802	43	43	—	Rain	28.878	51	51	—	Ditto	28.956	41	41	—	Ditto
M.	24	29.171	37	37	—	Fine	29.361	45	45	—	Boisterous	29.546	36	36	—	Clear & Fine
T.	25	—.623	38	38	—	Rain	—.475	47	47	—	Rain	—.333	45	45	—	Stormy with rain
W.	26	—.572	35	35	—	Very clear	—.591	44	32	12	Clear	—.625	41	41	—	Cloudy
☾ Th.	27	—.677	42	40	2	Overcast	—.687	52	40	12	Cloudy & Fine	—.691	44	44	—	Overcast
F.	28	—.942	42	42	—	Ditto	—.622	51	40	11	Ditto	—.743	34	34	—	Clear & Fine
S.	29	—.770	31	31	—	Frosty	—.807	49	45	4	Ditto	—.807	36	36	—	Do. & frosty
S.	30	30.105	32	32	—	Ditto	30.101	49	44	5	Clear & ditto	30.158	44	44	—	Overcast
M.	31	—.230	44	44	—	Cloudy	—.234	53	52	1	Overcast, Do.	—.223	44	44	—	Clear
		29.974	43.09	42.61	0.48		29.947	53.58	46.74	6.84		29.942	43.87	43.87	0.0	

OCTOBER.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	59	31	95	27	NE	Brisk	
2	60	32	96	28	——	Little	
3	57	38	80	34	——	Ditto	
4	57	29	100	24	——	Ditto	
5	61	31	95	26	N	Ditto	
6	60	34	95	28	NE	Ditto	
7	61	39	80	38	——	Ditto	
8	58	39	76	32	——	Ditto	
9	59	49	65	47	——	Ditto	
10	64	34	65	27	——	Ditto	
11	64	44	64	42	——	Ditto	
12	54	47	80	43	——	Ditto	
13	55	37	71	27	——	Ditto	
14	57	42	60	40	W	Ditto	
15	61	48	66	45	SE	Ditto	
16	55	48	70	45	NE	Ditto	
17	56	45	70	40	E	Ditto	
18	57	35	70	30	SW	Ditto	.40
19	59	25	78	18	NW	Brisk	.02
20	50	22	70	15	W	Little	
21	50	20	66	12	NW	Ditto	
22	48	38	48	31	SW	Strong	.50
23	52	30	62	25	——	Little	.07
24	46	27	46	22	——	Strong	
25	47	27	73	27	——	Little	.72
26	45	36	60	31	——	Brisk	
27	52	33	62	28	W	Ditto	
28	53	24	70	22	——	Little	
29	51	23	80	18	SW	Ditto	
30	51	39	60	35	——	Ditto	
31	52	33	65	29	——	Ditto	
	55.19	34.80	72.19	30.19			1.71

Remarks.

A great depression of temperature took place in this month, the mean being nearly 6° below the average. The wind set in from north-east on the 24th of last month, and continued almost constantly in the same direction till the 18th of the present. An unusually cold month appears to have been the consequence. Frosts set in as early as the 1st; and twelve frosty nights were indicated by the common thermometer, and twenty by the radiating one. On the night of the 21st the frost was remarkably severe for the period of the season, the thermometer being 12 below the freezing point, whilst the radiating thermometer sunk to 12°, or 20° below freezing. The beauty of the Dahlias and other similarly tender flowers was then of course completely spoiled for the season. No rain fell till the 18th, the barometer standing high; but the wind then became variable for a few days, and afterwards set in from the south-west, when the barometer fell exceedingly, and was remarkably low on the 23rd, about which time rain fell heavily.

Mean Pressure from the 3 daily observations 29.954 inches
—— Temperature .... Ditto ...... 46°.85
—— Dew Point .... Ditto ...... 44°.41
—— Degree of Dryness ... Ditto ...... 2°.44
—— Degree of Moisture ... Ditto ...... .919
—— Force of Vapour ..... Ditto ...... .333 inch.
Least observed degree of Moisture ...... .608
Maximum Temperature in the Shade .... 64°.
Minimum Temperature in ditto .... 20°.
Maximum Temperature in the Sun ......100°.
Minimum of Terrestrial Radiation ...... 12°.
Mean Temperature of External Air ..... 45°.02

WINDS.

North.......1 days.	N. East.....13 days.
South...... 0 ..	S. East ......1 ..
East.........1 ..	N. West .....2 ..
West........4 ..	S. West......9 ..

31 days.

Amount of Rain................1.71 inches

NOVEMBER.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer			Weather.	Barom.	Hygrometer.			Weather.
T.	1	30.216	43	43	—	Fine	30.161	53	48	5	Cloudless	30.114	36	36	—	Foggy
● W.	2	—.106	44	44	—	Foggy	—.084	49	49	—	Foggy	—.126	46	46	—	Ditto
Th.	3	29.983	41	41	—	Hazy	29.934	46	46	—	Hazy	29.955	38	38	—	Clear & Fine
F.	4	30.169	42	35	7	Cloudy	30.073	42	42	—	Showery	30.151	37	37	—	Clear
S.	5	—.177	38	38	—	Overcast	—.105	46	39	7	Ditto	—.104	40	40	—	Sleet
S.	6	—.122	40	40	—	Slight showers	—.131	43	39	4	Cloudy	—.148	40	40	—	Overcast
M.	7	—.100	42	42	—	Overcast	—.099	47	40	7	Ditto	—.131	41	41	—	Ditto
T.	8	—.126	42	42	—	Ditto	—.089	46	35	11	Ditto	29.959	41	41	—	Ditto
W.	9	29.790	42	40	2	Ditto	29.693	44	44	—	Densely Overcast	—.634	45	45	—	Stormy, rain
☽ Th.	10	—.651	49	49	—	Rain	—.600	51	51	—	Cloudy	—.494	44	44	—	Rain
F.	11	—.194	48	48	—	Ditto	—.089	55	55	—	Rain	—.548	51	51	—	Cloudy
S.	12	—.050	51	51	—	Stormy & wet	—.238	55	55	—	Cloudy & fine	—.516	42	42	—	Clear
S.	13	—.457	52	52	—	Cloudy	—.284	52	52	—	Boisterous, rain	—.290	50	50	—	Stormy
M.	14	—.696	46	46	—	Overcast	—.763	48	48	—	Fine	—.675	46	46	—	Boisterous, rain
T.	15	—.631	44	44	—	Stormy & wet	—.614	46	46	—	Rain	—.624	47	47	—	Dull & foggy
W.	16	—.717	44	44	—	Rain	—.733	45	45	—	Drizzly	—.896	39	39	—	Clear
Th.	17	30.182	40	38	2	Overcast	30.291	45	39	6	Overcast	30.451	39	39	—	Cloudy, fine
○ F.	18	—.532	35	33	2	Ditto	—.512	44	38	6	Cloudy	—.419	33	33	—	Ditto
S.	19	—.100	42	42	—	Rain	—.084	47	47	—	Rain	29.732	51	51	—	Overcast, heavy rain
S.	20	29.778	42	42	—	Cloudy	29.733	50	43	7	Overcast, fine	—.717	43	43	—	Overcast
M.	21	—.785	34	34	—	Clear	—.799	44	42	2	Clear	—.677	35	35	—	Ditto
T.	22	—.268	36	36	—	Rain	—.283	37	37	—	Rain and sleet	—.409	36	36	—	Clear
W.	23	—.485	35	35	—	Lightly overcast	—.432	47	47	—	Lightly overcast	—.152	45	45	—	Rain
☾ Th	24	28.890	44	44	—	Ditto	28.793	47	47	—	Fine	28.876	42	42	—	Lightning, rain
F.	25	—.86[illegible]	41	41	—	Overcast	—.816	44	44	—	Heavy Rain	—.988	44	44	—	Clear
S.	26	29.060	41	41	—	Clear	29.119	49	45	4	Lightly overcast	29.208	38	38	—	Ditto
S.	27	—.344	39	39	—	Fine	—.170	54	54	—	Fine	—.069	47	47	—	Stormy with rain
M.	28	28.928	50	50	—	Cloudy	28.893	54	54	—	Rain	—.266	43	43	—	Fine
T.	29	29.519	43	43	—	Very Fine	29.527	51	49	2	Very Fine	—.523	45	45	—	Overcast
W.	30	—.602	42	42	—	Fine	—.761	46	46	—	Fine	—.975	32	32	—	Clear
		29.684	42.40	41.97	0.43		29.663	47.56	45.53	2.03		29.694	41.86	41.86	0.0	

NOVEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	55	32	65	28	W	Little	
2	51	29	55	24	E	Ditto	
3	50	34	55	30	——	Ditto	.03
4	42	31	60	26	NE	Ditto	.01
5	46	32	50	27	——	Ditto	.01
6	47	36	60	33	——	Ditto	.01
7	48	38	50	33	——	Ditto	.01
8	46	38	54	35	NW	Ditto	
9	49	44	47	42	SW	Brisk	.04
10	50	41	50	38	S	Ditto	.03
11	55	47	55	45	——	Ditto	.37
12	55	45	58	41	W	Little	.40
13	54	39	54	36	SW	Strong	.29
14	53	43	58	42	E	Little	.67
15	46	44	46	42	——	Brisk	.32
16	45	37	45	31	——	Ditto	.02
17	45	30	45	25	NE	Little	
18	45	26	45	20	S	Ditto	
19	52	45	52	44	SW	Brisk	.87
20	49	34	52	27	NE	Little	
21	46	31	52	26	——	Ditto	.32
22	39	30	44	25	E	Ditto	.17
23	47	39	50	36	SW	Ditto	.11
24	50	40	54	37	——	Brisk	.32
25	48	39	52	34	S	Ditto	.12
26	50	29	55	26	SW	Little	.01
27	50	43	54	43	S	Ditto	.24
28	53	40	55	36	——	Ditto	.04
29	53	39	55	35	SW	Ditto	.01
30	52	29	54	24	W	Ditto	.01
	49.03	36.80	52.60	33.03			4.47

Remarks.

The weather in this month was almost constantly wet and frequently very boisterous. Frosts were of less frequent occurrence than in the preceding month and they were also less severe. Nearly 4½ inches of rain fell, being almost double the usual quantity for the month. The barometer was frequently very low, and more especially so in the last week. On the 24th, the depression was greater than at any other period of the year; the day was fine, but there were lightning and heavy rain at night.

Mean Pressure from the 3 daily observations 29.680 inches
—— Temperature..........Ditto...... 43°.94
—— Dew Point............Ditto...... 43°.12
—— Degree of Dryness......Ditto...... 0°.82
—— Degree of Moisture.....Ditto...... .938
—— Force of Vapour.......Ditto...... .317 inch.
Least observed degree of Moisture........ .681
Maximum Temperature in the Shade...... 55°.
Minimum Temperature in ditto.. .... 26°.
Maximum Temperature in the Sun........ 65°.
Minimum of Terrestrial Radiation........ 20°.
Mean Temperature of External Air....... 42°.91

WINDS.

North........0 days	N. East......7 days
South .... 6 ..	S. East.......0 ..
East ....6 ..	N. West ......1 .
West ....3 ..	S. West ......7 ..

30 days.

Amount of Rain ....4.47 inches.

DECEMBER.

		Morning.					Noon.					Night.				
1842.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
Th.	1	30.017	46	46	—	Slight Rain	30.017	52	52	—	Overcast	29.997	54	54	—	Overcast
● F.	2	—.028	54	54	—	Overcast	—.061	56	56	—	Densely clouded	30.079	48	48	—	Clear & Fine
S.	3	—.200	41	41	—	Ditto	—.232	52	52	—	Overcast	—.382	45	45	—	Foggy
S.	4	—.406	45	45	—	Foggy	—.390	52	52	—	Ditto	—.341	45	45	—	Overcast
M.	5	—.297	44	44	—	Light Haze	—.262	49	49	—	Very Fine	—.212	42	42	—	Foggy
T.	6	—.210	38	38	—	Foggy	—.212	40	40	—	Foggy	—.223	39	39	—	Overcast
W.	7	—.309	37	37	—	Ditto	—.304	40	40	—	Ditto	—.333	38	38	—	Dense Fog
Th.	8	—.404	35	35	—	Ditto	—.391	36	36	—	Ditto	—.389	32	32	—	Ditto
☽ F.	9	—.397	38	38	—	Ditto	—.351	44	44	—	Ditto	—.282	42	42	—	Ditto
S.	10	—.265	35	35	—	Overcast	—.205	40	40	—	Overcast	—.165	39	39	—	Overcast
S.	11	—.017	39	39	—	Foggy	29.946	43	43	—	Slightly Overcast	29.851	42	42	—	Clear & Fine
M.	12	29.802	50	50	—	Rain	—.850	55	55	—	Do. & mild	—.942	56	56	—	Light Rain
T.	13	30.007	52	52	—	Fine	30.017	59	55	4	Very Fine	—.999	50	50	—	Overcast
W.	14	—.088	49	49	—	Overcast	—.080	54	52	2	Exceedingly Fine	30.073	44	44	—	Very Fine
Th.	15	—.106	45	45	—	Very Fine	—.104	55	53	2	Ditto	—.091	47	47	—	Ditto
F.	16	—.038	48	48	—	Ditto	— 000	55	55	—	Densely Overcast	29.952	53	53	—	Ditto, clear
☉ S.	17	29.882	48	48	—	Slightly overcast	29.965	50	45	5	Very Fine	30.170	38	38	—	Ditto
S.	18	30.281	36	36	—	Fogg	30.281	46	46	—	Clear & Fine	—.402	38	38	—	Clear & Fine
M.	19	—.485	36	36	—	Ditto	—.485	44	44	—	Very Fine	—.448	39	39	—	Overcast
T.	20	—.397	45	45	—	Hazy	—.363	51	51	—	Hazy	—.312	49	49	—	Ditto
W.	21	—.268	49	49	—	Fine	—.250	53	53	—	Ditto	—.234	51	51	—	Ditto
Th.	22	—.164	50	50	—	Cloudy	—.063	52	50	2	Very Fine	29.853	50	50	—	Overcast
F.	23	29 608	46	46	—	Rain	29.551	46	46	—	Rain	—.614	38	38	—	Clear & Fine
☾ S.	24	—.651	32	32	—	Clear	—.700	50	50	—	Very Fine	—.794	32	32	—	Ditto
S.	25	—.815	32	32	—	Ditto	—.760	45	45	—	Overcast, Fine	—.659	49	49	—	Stormy
M.	26	—.548	50	50	—	Densely Clouded	—.463	51	51	—	Cloudy, windy	—.141	48	48	—	Ditto
T.	27	—.321	42	42	—	Rain	—.402	45	45	—	Ditto & damp	—.661	32	32	—	Frosty
W.	28	—.929	30	30	—	Frosty	30.050	40	40	—	Clear and fine	30.144	33	33	—	Ditto
Th.	29	30.174	47	47	—	Overcast	—.112	50	50	—	Densely clouded	—.149	51	51	—	Overcast
F.	30	—.161	52	52	—	Cloudy	—.200	55	55	—	Cloudy & fine	—.215	52	52	—	Ditto
● S.	31	—.112	51	51	—	Do. & Fine	—.046	55	55	—	Do. very fine	—.178	29	29	—	Clear
		30.074	41·93	41·93	00		30.100	47·25	46.77	0.48		30.074	43·38	43·38	00	

DECEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	54	52	55	51	S	Brisk	.01
2	55	32	55	27	——	Little	
3	53	42	53	41	SW	Ditto	
4	52	39	55	38	S	Ditto	
5	52	39	56	36	SW	Ditto	
6	40	36	42	35	S	Ditto	
7	39	33	40	30	——	Ditto	.01
8	37	31	37	29	SW	Ditto	
9	43	36	44	34	SE	Ditto	
10	39	38	39	36	S	Ditto	
11	43	38	44	35	SE	Ditto	.32
12	57	50	57	48	S	Ditto	.01
13	61	42	65	39	——	Ditto	
14	56	36	64	32	——	Ditto	
15	56	38	60	34	——	Ditto	
16	55	48	59	44	SW	Ditto	.06
17	51	31	56	27	W	Ditto	
18	47	35	51	29	——	Ditto	
19	45	35	47	29	——	Ditto	.01
20	52	46	52	45	SW	Ditto	.01
21	55	48	56	45	——	Ditto	.01
22	54	45	60	42	W	Ditto	
23	46	31	46	27	SW	Ditto	.09
24	50	25	55	21	——	Ditto	
25	50	48	50	47	——	Ditto	
26	51	41	51	40	——	Brisk	.20
27	47	25	52	21	W	Little	.01
28	43	27	52	23	——	Ditto	
29	52	46	52	45	——	Brisk	
30	55	46	57	45	——	Little	
31	54	30	55	25	——	Brisk	.02
	49.80	38.35	52.16	35.48			0.76

Remarks.

The weather was remakably mild for the period of the season. Very little rain fell, and there were only a few slight frosts; so that, on the whole, this may be considered the finest December that has been experienced for many years. The nights averaged nearly 4° warmer than those in October of the present year. The wind was 2 days from south-east; and during all the rest of the month, it was from the warm quarters of South, South-west, and West.

Mean Pressure from the 3 daily observations	30.082 inches.
—— Temperature ....Ditto......	44°.18
— Dew Point ....Ditto......	44°.02
—— Degree of Dryness ......Ditto......	0°.16
—— Degree of Moisture .....Ditto......	.994
—— Force of Vapour........Ditto......	.328 inch.
Least observed degree of Moisture	.876
Maximum Temperature in the Shade......	61°.
Minimum Temperature in ditto..........	25°.
Maximum Temperature in the Sun........	65°.
Minimum of Terrestrial Radiation........	21°.
Mean Temperature of External Air.......	44°.07

Winds.

North.......... 0 days	N. East .... 0 days
South ....10 ..	S. East .... 2 ..
East .... 0 ..	N. West .... 0 ..
West .... 9 ..	S. West ....10 ..

31 days.

Amount of Rain ....0.76 inch.

Monthly Mean Pressure, Temperature, and Dew Point, &c. of 1842; deduced from the Observations recorded in the preceding Journal.

1842. Months.	Pressure. Max.	Min.	Med.	Range of Barom.	Mean at Morn.	Noon.	Night.	Mean of the three Observations.
Jan. .	30.452	29.100	29.969	1.352	29.983	29.944	29.977	29.968
Feb. .	30.488	29.115	29.937	1.373	29.968	29.938	29.920	29.942
March	30.332	29.152	29.824	1.180	29.866	29.848	29.782	29.821
April	30.355	29.303	30.029	1.052	30.035	30.017	30.015	30.022
May .	30.387	29.197	29.904	1.190	29.911	29.898	29.900	29.903
June.	30.296	29.420	29.994	0.876	30.013	29.993	29.970	29.992
July .	30.388	29.611	29.940	0.777	29.941	29.945	29.936	29.919
Aug.	30.399	29.621	29.991	0.778	30.002	29.991	29.988	29.993
Sept.	30.203	29.341	29.813	0.862	29.821	29.806	29.807	29.811
Oct. .	30.490	28.802	29.958	1.688	29.974	29.947	29.942	29.954
Nov. .	30.532	28.793	29.686	1.739	29.684	29.663	29.694	29.680
Dec. .	30.485	29.141	30.084	1.344	30.074	30.100	30.074	30.082
Aver.	30.400	29.216	29.927	1.184	29.931	29.924	29.917	29.924

1842. Months.	Temperature. In the Shade. Max.	Min.	Med.	Mean at Morn.	Noon.	Night.	Mean of the three Observs.	In Sun's Rays. Max.	Min.	Terrestrial Radiation. Min.	Max.	Med. of Sun and Rad.
Jan. .	47	18	32.45	32.31	36.70	33.03	34.01	50	30	32	11	31.0
Feb. .	54	23	40.03	39.92	46.10	39.28	41.76	65	40	46	18	40.7
March	60	26	44.98	43.83	50.54	44.51	46.29	75	52	48	21	47.6
April	75	23	46.28	46.13	54.40	39.96	46.85	98	48	40	17	48.7
May .	73	30	53.73	55.16	62.38	50.93	56.15	84	52	49	24	54.6
June.	90	41	63.56	65.47	74.43	61.16	67.02	110	72	53	35	68.2
July .	84	40	60.80	62.39	69.29	57.12	62.93	107	70	56	33	68.9
Aug.	93	43	66.27	66.77	73.67	61.38	67.27	120	75	58	38	73.8
Sept.	81	38	57.56	57.53	63.50	54.70	58.58	108	61	58	34	65.1
Oct. .	64	20	45.02	43.09	53.58	43.87	46.85	100	46	47	12	51.19
Nov. .	55	26	42.91	42.40	47.56	41.86	43.94	65	44	45	20	42.8
Dec. .	61	25	44.07	41.93	47.25	43.38	44.18	65	37	51	21	43.5
Aver.	69.75	29.41	49.80	49.73	56.61	47.59	51.33	87.25	52.25	48.58	23.66	52.9

1842. Months.	Hygrometer indicating Dew Point. Mean Dew Point at Morn.	Noon.	Night.	Mean Dew Point.	Mean Force of Vapour.	Mean degree of Dryness.	Mean degree of Moisture.	Least degree of Moisture.
Jan. .	31.35	34.74	32.58	32.89	.223	1.12	961	730
Feb. .	39.28	43.53	39.28	40.69	.288	1.07	996	710
March	43.16	44.58	44.22	43.98	.327	2.31	921	636
April	41.13	41.63	38.33	40.36	.284	6.47	784	441
May .	51.51	49.67	50.12	50.43	.407	5.72	896	427
June.	58.44	58.10	58.66	58.40	.526	8.62	752	435
July .	57.71	58.29	56.70	56.32	.518	5.36	848	443
Aug.	63.58	61.09	61.12	61.93	.592	5.34	839	453
Sept.	57.10	58.70	54.65	56.81	.504	1.77	942	665
Oct.	42.61	46.74	43.87	44.41	.333	2.44	919	608
Nov.	41.97	45.53	41.86	43.12	.317	1.02	938	681
Dec. .	41.93	46.77	43.38	44.02	.328	0.16	994	876
Aver.	47.48	49.11	47.06	47.88	.387	3.45	899	591

1842. Months.	Scale of the Winds. N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Days.	Rain. In. Pts.
Jan. .	2	4	2	4	4	5	3	7	31	1.06
Feb. .	0	0	5	0	12	3	4	4	28	1.32
March	3	0	0	1	3	11	10	3	31	1.81
April	3	13	11	2	0	0	0	1	30	0.15
May .	3	5	0	0	7	6	6	4	31	1.73
June.	0	8	3	1	2	7	6	3	30	1.58
July .	6	2	4	2	2	7	7	1	31	1.52
Aug.	1	7	7	1	3	6	5	1	31	2.81
Sept.	1	8	5	1	2	5	6	2	30	3.39
Oct.	1	13	1	1	0	9	4	2	31	1.71
Nov.	0	7	6	0	6	7	3	1	30	4.47
Dec. .	0	0	0	2	12	8	9	0	31	0.76
Aver.	20	67	44	15	53	74	63	29	365	22.31

VIII. *On the Exhaustion of Soils.* By EDWARD SOLLY, *Esq., F. R. S., F. L. S., Hon. Memb. Roy. Agr. Soc. Eng. Experimental Chemist to the Horticultural Society.*

(Communicated by the CHEMICAL COMMITTEE.)

ALTHOUGH it is well known that some plants take more from the soil than others do, some requiring a large quantity of inorganic matters, such as Alkalies and the earthy Phosphates, whilst other plants require a comparatively small quantity, and hence in growing do not exhaust or impoverish the soil to so great an extent; yet there are many points connected with the subject, and having immediate reference to practical operations, which are by no means so clear as could be wished. The following observations relate to one of these questions in particular, viz. what is the maximum and minimum of exhaustion, for any given plant. In a previous paper it has been shown, that the same plant grown in the same soil but differently manured, exposed to the influence of particular substances, or placed under different conditions, contains variable proportions of inorganic matter. This naturally leads to the question of how far these conditions are under our controul, because if they are so to any extent, it is evident that that mode of cultivation must be most desirable, in which the largest amount of vegetable matter is formed, at the least expence of inorganic matter.

The plant selected for some experiments on this subject was the Red Mangel Wurzel, which was cultivated in rich soil, abundantly supplied with animal manure. A fair average plant was examined

from week to week, to note the ratio existing between the vegetable matter formed, and the inorganic matter abstracted from the soil. In the early part of the experiment the rate of growth was very regular, so that by weighing a few plants from time to time the increase in weight of the roots every day might be readily ascertained. The experiment was commenced in July when the roots weighed about 3 oz. each, and were then increasing at the rate of nearly an ounce a day; this rate of increase appeared to continue pretty regularly, for about six weeks, after which the plants grew far less regularly, an effect in part due to the unsettled state of the weather. The following Table shows the composition of the roots examined, during fifteen consecutive weeks, and also the composition of the seeds previous to germination.

Composition of Red Mangel Wurzel Seed previous to germination.	Water.	Organic matter.	Inorganic matter.	Inorganic in 10000 pts. dry seed.
	1470	7940	590	691

	Roots.			Leaves.			Weather.	
	Water.	Organic matter.	Inorganic matter.	Water.	Organic matter.	Inorganic matter.	Rain in inches.	Average temp. Fahr.
1st week .	9135	748	117	9295	535	170	0.32	64
2d Do. . .	8930	965	105	9330	516	154	1.28	57
3d Do. .	9050	843	107	9254	635	111	0.00	64
4th Do. . .	9159	778	63	9420	433	147	0.78	67
5th Do. .	9184	729	87	9256	582	162	1.20	59
6th Do. . .	9377	526	97	9444	404	152	0.05	68
7th Do. .	9279	634	87	9330	475	195	0.52	64
8th Do. . .	9271	621	108	9376	455	169	0.01	65
9th Do. .	9184	718	98	9368	505	127	0.20	61
10th Do. . .	9186	715	99	9696	240	64	0.36	53
11th Do. .	8860	1051	89	9130	654	216	0.49	59
12th Do. . .	9066	843	91	9198	594	208	0.74	44
13th Do. .	8890	1098	112	9055	720	225	0.95	42
14th Do. . .	9007	881	112	8439	1356	205	0.77	45
15th Do. .	9027	973	85	9107	737	156	1.35	47

The results of this series of experiments exhibit less regularity than might have been expected; the conclusions to be drawn from them as regards the degree of exhaustion are arranged in the following Table.

	Roots.		Leaves.	
	Inorg. matt. in 10000 parts dry.	Organ. matt. = 100 parts inorganic.	Inorg. matt. in 10000 pts. dry.	Organ. matt. = 100 parts inorganic.
1st week .	1354	639	2409	314
2d Do. . .	987	919	2301	335
3d Do. .	1134	787	1497	572
4th Do. . .	760	1234	2533	294
5th Do. .	1067	837	2186	359
6th Do. . .	1565	542	2689	265
7th Do. .	1209	728	2913	243
8th Do. . .	1486	575	2713	269
9th Do. .	1203	732	2024	397
10th Do. . .	1220	722	2102	375
11th Do. .	784	1169	2311	302
12th Do. . .	1025	926	2592	285
13th Do. .	1015	990	2389	320
14th Do. . .	1129	786	1316	661
15th Do. .	876	1144	1748	472

It is worthy of note that in examining this series of plants it was observed that the young roots for the first two weeks contained small traces of Nitric acid, whilst for the three first weeks the leaves contained a very large quantity; in the third and fourth week the roots contained a considerable portion of Nitric acid, but after that little or none could be detected; from the fourth to the eleventh week the leaves also contained a considerable quantity, but during the three last weeks of the experiment the leaves like the roots were quite destitute of any Nitrates.

At the same time with these experiments a similar examination was made of the experimental Mangel Wurzel roots, which formed the subject of the experiment already described (p. 86 of this volume). The following is the relative composition of this series of plants.

Manure applied.	Water.	Organic matter.	Inorganic matter.	Inorg. matt. in 10000 parts dry.
1. Muriate of Lime .	9075	837	98	1092
2. Phosphate of Ammonia	9090	817	93	1029
3. Sulphate of Potash .	9032	854	114	1185
4. Muriate of Ammonia	9085	814	101	1110
5. Nitrate of Potash .	9014	889	97	984
6. Common Salt .	8991	911	98	975
7. No Manure . .	8858	1027	115	1014
8. Muriate of Potash .	8935	972	93	878
9. Nitrate of Soda .	9064	838	98	1047
10. Sulphate of Magnesia	9039	850	111	1163
11. Sulphate of Soda .	9154	742	104	1242
12. Superphosphate of Lime	9332	568	100	1496
13. Carbonate of Soda .	8941	963	96	917
14. Sulphate of Ammonia	9142	766	92	1076
15. Phosphate of Soda	9179	712	109	1326
16. Rotten Dung .	8945	947	108	1024

By comparing these numbers with those already given (p. 86), as expressing the weights of the several crops, it is easy to calculate the relative value of each crop as expressed by the effect produced in deteriorating the soil. Hence we at once get a reply to the question, whether the largest crop exhausts the soil more, or less, than the smaller ones, in proportion to the amount of food or vegetable matter formed. This is shewn in the following Table which contains the weight of the crop per acre, the quantity of inorganic matter removed from the soil by each crop, the quantity of dry organic matter equivalent to 100 parts of the inorganic matter thus abstracted, and the assumed effect produced by each crop, arranged in the order of their exhausting effects.

	Weight of Crop. cwt.	Inorg. matter in Crop. lbs.	Dry. organic matt=100 pts. inorg.	Assumed relative exhaustion.
12. Superphosphate of Lime	530	594	568	1839
15. Phosphate of Soda .	513	626	653	1583
11. Sulphate of Soda .	647	753	713	1465
3. Sulphate of Potash .	754	963	749	1395
10. Sulphate of Magnesia	627	929	765	1366
4. Muriate of Ammonia	658	745	805	1298
14. Sulphate of Ammonia .	457	471	832	1256
1. Muriate of Lime .	939	1032	854	1223
9. Nitrate of Soda .	682	682	855	1222
16. Rotten dung . .	676	820	876	1192
2. Phosphate of Ammonia	715	745	878	1190
7. No manure . .	617	805	892	1171
5. Nitrate of Potash .	736	800	916	1140
6. Common salt . .	774	850	929	1124
13. Carbonate of Soda .	653	702	1031	1001
8. Muriate of Potash	696	725	1045	1000

It is evident then from this Table, that the rate of exhaustion is quite independent of the weight of the crop. Thus for example, taking Phosphate of Ammonia as a standard of comparison, it appears that Sulphate of Ammonia produced a smaller, and Muriate of Lime a larger crop; yet, both of these crops exhausted the soil more than the standard, just in the proportion that 1256 and 1223 are more than 1190. Again no manure produced a smaller, and common salt a larger crop, than Phosphate of Ammonia did, but both of them, in proportion exhausted the soil less than the standard in the ratio of 1171 and 1124 to 1190. In arriving at this

conclusion, however, it must be remembered that as the nature of the inorganic substances absorbed by plants, varies as well as their quantity, it does not follow that that plant which takes up most earthy matter does most injury to the soil. It is in fact more probable that the amount of Phosphoric acid taken up by the crop would be a fairer standard of exhaustion; but even this does not seem to be quite accurate in all cases, because though in some experiments it was found that the earthy matter bore a smaller relation to the organic matter, just in proportion to the quantity of Phosphoric acid it contained; yet there were so many exceptions to this rule, as to render its applicability very questionable.

Previous experiments had made it appear probable that some relation existed between the rapidity of growth, and the proportion of earthy matters existing in the plants. In the experimental Peas (p. 86) very little effect was produced by the various manures employed; Common Salt and Nitrate of Soda slightly improved the growth of the plants, they were rather larger and more flourishing than the other ten squares, but the produce in seed was rather less. In July, when the seeds were fully formed, but still quite soft and green, they were examined; the following Table shews their composition, and the relation of inorganic to organic matter at this time.

	Water.	Organic matter.	Inorganic matter.	Inorg. matt. in 10000 parts dry.	Organic matt. = 100 parts. inorg. dry.	Assumed relative exhaustion.
Nitrate of Soda .	7383	2526	91	347	2775	1228
Phosphate of Ammonia	7288	2625	87	323	2982	1142
Muriate of Ammonia .	7068	2838	94	323	2987	1140
Sulphate of Potash .	7105	2803	92	319	3025	1126
Sulphate of Soda .	7080	2830	90	317	3052	1116
Common Salt .	7042	2868	90	312	3105	1097
Phosphate of Lime .	7135	2778	87	306	3160	1078
Sulphate of Lime .	7180	2735	85	309	3190	1068
Muriate of Potash .	6893	3013	94	303	3195	1066
No manure .	7073	2837	90	308	3300	1032
Sulphate of Magnesia	6639	3264	97	289	3360	1014
Sulphate of Ammonia	6921	2992	87	285	3408	1000

Three months later, when the Peas were perfectly ripe, and had been gathered in and weighed, they were a second time examined;

and though still very uniform in composition, the proportion of inorganic manner, differed a good deal from that in the green Peas. The results of this second series of experiments, which bear more immediately on the subject of inquiry, are contained in the following Table.

	Ripe Peas.						
	Water.	Organic matter.	Inorganic matter.	Inorg. matt. per 10000 pts. dry.	Crop, per acre.	Dry organic matt. = 100 pts. inorgan.	Assumed relative exhaustion.
					cwt. lbs.		
Common Salt .	1110	8610	280	316	17 76	3063	1127
Sulphate of Lime .	1057	8670	273	305	18 75	3171	1092
Nitrate of Soda .	1090	8640	270	303	16 54	3200	1079
Sulphate of Soda .	997	8833	270	299	18 64	3234	1068
Phosphate of Lime	957	8777	266	295	21 84	3291	1049
Sulphate of Potash	1044	8693	263	294	19 19	3301	1046
Muriate of Ammonia	1014	8723	263	293	22 61	3312	1043
Sulphate of Ammonia	1000	8737	263	292	19 52	3317	1041
No manure . .	927	8810	263	292	21 104	3345	1032
Sulphate of Magnesia	1024	8716	260	291	18 97	3352	1030
Phosphate of Ammonia	860	8880	260	248	18 31	3415	1011
Muriate of Potash .	874	8870	256	281	21 51	3455	1000

From this Table it is clear that the crops which at first grew most vigorously, and seemed most benefited by the manures, namely, those to which common Salt and Nitrate of Soda had been applied, absorbed in consequence a considerably larger proportion of earthy matters; as from the numbers in the last column it appears, that in those plants the relation of inorganic to organic matter, is higher than in most of the others. The experiments already described on Mangel Wurzel are on the other hand opposed to this view, and the following examination of the Experimental Potatoes likewise leads to very different conclusions, because in place of finding that those plants which grew most vigorously, or yielded the largest return of produce, contained most inorganic matter, we find that set of plants which grew most luxuriantly and produced the largest crop, was also that in which the smallest proportion of inorganic matter was contained; a result which is further borne out by the experiments on Potatoes, of the previous year, described at p. 48.

	Potatoes.						
	Water.	Organic matter.	Inorganic matter.	Inorg. matt. in 10000 parts dry.	Crop, per acre.	Dry organic matt. = 100 parts inorg.	Assumed relative exhaustion.
					cwt.		
Sulphate of Ammonia	7315	2527	158	590	289	1594	1412
Common Salt .	7508	2345	147	570	302	1654	1360
Nitrate of Soda .	7636	2237	127	540	309	1751	1285
Sulphate of Soda .	7590	2280	130	540	266	1751	1285
Sulphate of Lime	7568	2305	127	525	231	1804	1248
Muriate of Potash .	7679	2200	121	525	300	1804	1248
Sulphate of Magnesia	7613	2271	116	500	279	1900	1185
Phosphate of Ammonia	7504	2374	122	490	262	1940	1160
No manure . .	7724	2166	110	485	227	1961	1140
Phosphate of Lime	7668	2223	109	470	257	2021	1113
Sulphate of Potash .	7695	2199	106	460	241	2073	1081
Muriate of Ammonia	7743	2164	93	425	341	2252	1000

In experiments of this kind, considerable variations have been found in the composition of the inorganic substances which plants contain, when thus cultivated under different circumstances; and therefore we must not at once conclude that such results are rigorously correct. From these, however, and a number of other experiments, I have no doubt that a large and healthy crop does really in proportion exhaust the soil less than a smaller and less flourishing one; nay, even, that under certain circumstances a moderate crop will take more out of a soil, or be more exhausting to it, than a larger one.

Bedford Row,
15*th January,* 1845.

IX.—*On Seed-Steeping.* *By* Edward Solly, *Esq., F. R. S., F. L. S., Hon. Memb. Roy. Agr. Soc. Eng. Experimental Chemist to the Horticultural Society.*

(Communicated by the Chemical Committee.)

From very early times it has been a favourite idea with the followers of husbandry, that the produce of the ground might be greatly increased by causing the seed to undergo some process of preparation previous to its being sown. On looking over the various writings of those who have made agriculture their study, one cannot but observe how very frequently, great importance is attributed to the preparation of the seed; and considering the multitude of books which have been written, and the number of experiments made by succeeding generations, it is not a little remarkable that even at the present day it should still be open to inquiry whether the steeping or preparation of the seed, does or does not, to any extent supply the necessity of manure. We are told by Virgil;

> Semina vidi equidem multos medicare serentes,
> Et nitro prius, et nigrâ perfundere amurcâ,
> Grandior ut fœtus siliquis fallacibus esset.

and we are told at the present time that by steeping the seeds of corn, &c., in certain solutions, of nitre and other salts, a small quantity will be absorbed, which will greatly increase the vigour and luxuriance of young plants, and ensure without further manure a much larger and more plentiful harvest, than could possibly be obtained without the previous steeping.

I will not attempt to give any sketch of what has been written on the subject of seed-steeping, which would necessarily lead to long and tedious details, but I shall content myself with a few brief

quotations from the writings of some of the most ingenious men of their times, as an introduction to my own experiments.

The writings of many of the agriculturists of the seventeenth century display a remarkable spirit of inquiry, associated with a correctness of reasoning, hardly to be expected in such early days, and almost free from the narrow-minded fear of innovation which characterises many of the writers of the last century. In the writings of Plattes for example, there are suggestions which may be studied with advantage even at the present day. The following remarks on the steeping of seeds are from his "Discovery of hidden Treasure," published in 1639, and follow some good observations on liquid manure. "When the sun hath exhaled the greater part of the dung-water, and that it groweth thickish and fat, then reserve a good pit full thereof well bottomed with clay, that will hold water, and at seed-time steep your seed-corn in it, but put the fat water to it by little and little as it drinketh it up; that at the last it may be almost dry of itself: but before it be full dry, sift a small quantity of lime amongst it, that so it may grow dry with the lime, and grow like comfits, then with this seed sow or set your most remote ground from your dunghills, and by this means you will save ten times as much labour in carriage of your dung, so far as this labour cometh too, and as for your crop, though you shall not have so much increase as some, have mountebanklike reported of it, yet you shall have a good material increase, for one crop only.

"And I have sometimes spritted the corn a little, as they use to do for malt, and then have sown it, and it came up speedily and got the predomination of the weeds at first, and so kept the same, whereby I had far greater increase than ordinary. Also I found sometimes when a dry season came upon the sowing, that my corn thus ordered took root far better than other mens' corn who would not take this small pains to steep it and sprit it."

About this period attention was drawn to seed-steeping by Lord Bacon, who made a number of experiments on the subject, which

possess considerable interest. The following account of them is from the fifth century of his Sylva Sylvarum, or Natural History, published in 1664, after his death.

" There were sown in a bed turnip seed, raddish seed, wheat, cucumber seed, and peas. The bed we call a hot bed, and the manner of it is this. There was taken horse-dung, old and well rotted; this was laid upon a bank half a foot high, and supported round about with planks, and upon the top was cast sifted earth some two fingers deep, and then the seed sprinkled upon it, having been steeped all night in water mixed with cow-dung.

" The turnip seed and the wheat came up half an inch above ground within ten days after, without any watering: the rest the third day. The experiment was made in October; and it may be, in the Spring the acceleration would have been the speedier. This is a noble experiment, for without this help they would have been four times as long in coming up. But there doth not occur to me at this present, any use thereof for profit, except it should be for sowing of peas which have their price very much increased by the early coming. It may be tried also with cherries, strawberries, and other fruit which are dearest when they come early.

" There was wheat steeped in water mixed with cow-dung; others in water mixed with horse-dung; in water mixed with pigeon's dung; in human urine; in water mixed with chalk powdered; in water mixed with soot; in water mixed with ashes; in water mixed with bay salt; in claret wine; in malmsey wine; and others in spirit of wine. The proportion of the mixture was a fourth part of the ingredients to the water, save that there was not of the salt above one-eighth. The urine, wines, and spirit were simple, without mixture of water. The time of steeping was twelve hours, the time of the year October. There was also other wheat sown unsteeped but watered twice a day with warm water. There was also other wheat sown simple to compare with the rest. The event was that those which were in the mixture of dung, urine, soot, chalk,

ashes, and salt came up within six days, and those that afterwards proved the highest, thickest, and most lusty, were first the urine, then the dungs, next the chalk, next the soot, next the ashes, next the salt, next the wheat simple, next that watered twice a day with warm water, next the claret wine. So that those three last were slower than ordinary wheat itself, and this culture did rather retard than advance. As for those that were steeped in malmsey and spirit of wine, they came not up at all. This is a rich experiment for profit; for the most of the steepings are cheap things and the goodness of the crop is a great matter of gain; if the goodness of the crop answer the earliness of the coming up, as it is like it will; both being from the vigour of the seed, which also partly appeared in the former experiment, as hath been said."

The experiments of Bacon and the good opinion which he seems to have had of the value of seed-steeping caused many to take up the subject; various solutions were recommended; and as various was the success which attended their use. The following cautious observations of Blith (1649), are interesting in connexion with the preceding account of Bacon's experiments.

"Sir Francis Bacon is of opinion that salt mingled with corn hath a very good operation, being sowed with the corn, which possibly may, because brackishness is fruitful to the land, also that chalk and lime sowed with the corn is very helpful and that steeping of your corn in fat water, lime-water, or dunghill-water, hath a wonderful effect to work strange things, of all which myself having not made full experience, can find no more advantage therein than just so much as is added to the corn either of the chalk or lime in substance, or so much as is added of the soil or fatness of either of the waters and no more. For having made a thorough trial thereof found no otherwise, nor nothing of that great advantage promised; but let me not prejudice any ingenious trials of the same, others may find more, possibly I might miss in the manner of my application."

On reading over the opinions of those who stated that they had tried the process of seed-steeping, it will be observed that they are for the most part unfavourable, though generally qualified by a modest doubt of the accuracy of their conclusions, and the decisiveness of their experiments. This is illustrated in the observations of Blith, and also in the following remarks of Sir Hugh Plat (1653). "Now a word or two of those conceited practices, which I promised before. I have heard some studient practisers very confidently affirm, that if you steep your corn in water, the space of certain hours (but I could never yet find them all agree in one time; for some limit, twelve hours, some eighteen, and some thirty-six hours, you may prove them all and keep the best) in water, wherein good store of cow-dung hath lain in imbibition for certain days, (which times you must also search, if you mean to be an exact master) every day stirring the same once or twice together before you lay in your corn, and after this preparation you sow the same (though in barren ground) that so you shall purchase a most rich and plentiful crop with an easy charge. But this kind of practice, I have heard both maintained and impugned as well by reason as by experience, and that by men of good judgment on both sides, although if I would set down my own experience herein, I must needs confess I could never yet attain to any truth in this secret, or to make any apparent difference between the corn that was husbanded in this manner and that which grew of itself without any such help (yet will I not for the credit of the reporters) altogether discredit the invention, for that peradventure I might fail in the nature of the grain or in the time of imbibition."

He then proceeds to relate a successful experiment in which corn was mixed with dung and water, the whole being well stirred together for one hour; after standing some hours it was again stirred for half an hour, and then left at rest all night. On the following morning the water was permitted to drain away, and the corn and dung together then sown on very poor barren soil; the crop

obtained was most plentiful, as if the ground itself had been well manured. This experiment however can hardly be fairly classed amongst those on seed-steeping, though at the same time it is probable that the effects produced were in great part similarly caused to those which from time to time have been produced by mere steeping.

Within the last three or four years public attention has been again drawn to the subject of seed-steeping by reports of the wonderful crops obtained from steeped seeds. In Germany M. Bickes and M. Victor, and Mr. Campbell in our own country, have described the surprising effects on vegetation produced by various steeps; indeed, the accounts published by the German authors are so marvellous, and the deductions made by them from the results of their experiments so startling, that they could not fail to excite curiosity and induce experiment, though on consideration we feel assured that the authors must have either been greatly deceived themselves, or willing to exaggerate their results a little in order to excite the attention of their readers. The experiments of these authors are so well known that it is unnecessary here to recapitulate them further, than to observe that the principle put forth was the same as that advanced so long since by Bacon and others, that by manuring the seed previous to sowing it, a far better harvest would be obtained; the plants would grow with greater vigour and luxuriance, and in consequence would be less liable to blights and the ravages of insects. Some of the recent advocates of seed-steeping have gone much further than this, and have asserted that by properly preparing the seed, it may be made to absorb such a quantity of those substances which growing plants require, that, when placed in the ground it will contain within itself such a store of inorganic food, as to be quite independent of the soil, and therefore in growing not exhaust the latter at all.

The object, contemplated in the following series of experiments made at the Garden of the Horticultural Society in the Spring of

1844, was to ascertain whether any and what effect would be produced by steeping various seeds in certain simple solutions previous to sowing, and to submit the plants subsequently to chemical examination should any differences be observed which might render such a proceeding desirable.

The ground selected for the experiments was uniform and had not been previously used for chemical experiments, its composition was very nearly the same as that of the ground employed in the experiments of last year (see p. 36 of this volume). The seeds were all good, being selected on purpose, and the whole of each kind of seed was sown at the same time. Saturated solutions of pure nitrate of soda, chloride of calcium, sulphate of magnesia, muriate of ammonia, phosphate of ammonia, and common salt were made, and these diluted by the addition of nine times as much pure water; enough of each steep was taken to cover entirely the portion of seeds to be steeped, the quantity of solution being invariably two fluid ounces; the seeds were left in the solution until they had swelled considerably, and it became evident that in a little time more they would sprout, when they were withdrawn from the solutions, drained on paper, and then sown. During the whole time of steeping they were kept in the dark. Besides the six portions of seeds steeped in the above mentioned solutions, two others were sown, one of which had been soaked a corresponding time in water alone, and one which had not been steeped at all; thus the effect would be observed, of steeping in water alone as distinguished from the additional effect produced by each salt employed. The beds intended for each particular sort of seed were divided into forty rows, and each of the eight parcels of seed was subdivided into five portions, so as to allow one to each row. Thus the first eight rows received each of them a portion of the same sort of seed differently prepared, the series of eight being repeated five times over, the first, ninth, seventeenth, twenty-fifth, and thirty-third row containing seeds similarly prepared; each row having in fact four more rows like itself, but separated from each

other as widely as possible, so as to ensure fair average results by diminishing the chance of any local circumstances interfering with the experiments. Each row contained thirty seeds, so that there were 150 seeds of each sort, for each steep; the seeds were sown early in April. The experiment was under the care of Mr. Thompson.

1. Wheat. At first these seeds exhibited considerable differences in the time required for germination, after a little time, however, they came up pretty generally but grew irregularly, and did not form good ears, the following table shows the number of young plants up:

	Eleven Days after Sowing.					Total.
Nitrate of Soda .	0	3	2	1	1	7
Chloride of Calcium .	0	4	1	1	4	10
Sulphate of Magnesia	11	4	3	4	8	30
Muriate of Ammonia	0	4	1	1	3	9
Nothing . . .	3	1	3	1	4	12
Phosphate of Ammonia	7	1	2	11	9	30
Water . . .	0	1	2	2	3	8
Common Salt . .	2	2	1	3	0	8

2. Barley. The experiments with barley succeeded better than those with wheat, two of the solutions appeared to have done some good, for the seeds steeped in them at first had rather the advantage over the others; this difference, however, very soon disappeared, and in a short time when the plants had attained a height of six inches no difference could be perceived. The plants spread and formed abundance of ears, the grain in which ripened well. but no marked differences could be perceived amongst them:

	Ten Days after Sowing.					Total.	Twelve Days after Sowing.					Total.	Whole Produce.		Grain.		Straw.	
													lb.	oz.	lb.	oz.	lb.	oz.
Nitrate of Soda .	0	0	1	1	0	2	0	3	3	1	2	9	8	7	3	1	4	11
Chloride of Calcium .	0	0	0	0	3	3	0	5	3	3	5	16	7	12	3	0	4	1
Sulphate of Magnesia	12	4	3	1	3	23	17	4	4	6	9	40	7	13	3	4	4	2
Muriate of Ammonia	0	3	1	0	0	4	2	4	1	1	4	12	7	8	3	1	3	12
Nothing . . .	3	0	2	0	1	6	5	2	7	1	5	20	8	9	3	6	4	5
Phosphate of Ammonia	5	1	2	10	8	26	8	1	3	12	9	33	7	12	3	3	3	14
Water . . .	0	1	0	1	2	4	4	4	3	2	4	17	8	3	3	3	4	3
Common Salt . .	0	0	0	0	0	0	3	2	2	4	0	11	8	7	3	3	4	7

3. OATS. Oats germinated and came up with very great regularity; the following table shows the whole number up in seventeen days after sowing, and also the weight of the crop produced by each steeping:

	Total Young Plants after 17 Days.	Produce.			
		Grain.		Straw.	
		lbs.	oz.	lb.	oz.
Nitrate of Soda .	125	1	7	3	4
Chloride of Calcium .	120	2	3	5	0
Sulphate of Magnesia	126	1	13	3	15
Muriate of Ammonia	126	2	2	4	3
Nothing . . .	133	1	14	4	1
Phosphate of Ammonia	119	2	1	3	12
Water . . .	128	2	2	4	1
Common Salt . .	123	1	4	4	5

In this experiment no appreciable difference was perceptible in the time when the different rows of seed came up; they germinated at nearly the same time, and at no period of their growth did the plants exhibit any differences in appearance.

4. RYE. These seeds came up with far more irregularity than the oats, all the steeps more or less retarding the germination of the seeds. As the plants did not shoot into ear regularly, no account of the weight of the produce could be kept. The following table shows the number of plants above ground in the tenth and twelfth day after sowing:

	Ten Days after Sowing.					Total.	Twelve Days after Sowing.					Total.
Nitrate of Soda .	0	0	0	0	0	0	0	0	6	7	1	14
Chloride of Calcium .	0	4	0	4	1	9	0	7	5	5	3	20
Sulphate of Magnesia	3	4	0	3	8	18	7	5	0	3	14	29
Muriate of Ammonia	0	0	0	0	5	5	2	0	0	0	9	11
Nothing . . .	8	0	8	5	18	39	13	3	13	11	22	62
Phosphate of Ammonia	0	0	2	0	5	7	3	1	4	1	7	16
Water . . .	2	0	0	11	0	13	3	0	4	9	2	18
Common Salt . .	3	0	0	1	0	4	3	1	0	2	0	6

5. PEAS. Out of the eight series of peas sown only three germinated, the remaining five were evidently destroyed by the steeps.

The three which came up were those not prepared at all, those merely soaked in water, and those steeped in sulphate of magnesia. The following was the result of this experiment:

	Seventeen Days after Sowing.	Green Crops.	Seed.		Straw.	
		lbs.	lbs.	oz.	lbs.	oz.
Nitrate of Soda .	0	0	0	0	0	0
Chloride of Calcium .	0	0	0	0	0	0
Sulphate of Magnesia	65	19	4	3	3	6
Muriate of Ammonia	0	0	0	0	0	0
Nothing . . .	94	18	5	2	3	12
Phosphate of Ammonia	0	0	0	0	0	0
Water . . .	106	19	5	7	4	2
Common Salt . .	1	0	0	0	0	0

6. Turnips. The seeds steeped in water were the first to come up. Unfortunately the fly took the greater number of the young plants and destroyed the experiment eight days after sowing. The following were the number of plants up:

Nitrate of Soda .	1	Nothing . . .	28
Chloride of Calcium .	34	Phosphate of Ammonia	4
Sulphate of Magnesia .	34	Water . . .	35
Muriate of Ammonia .	11	Common Salt . .	40

7. Mustard and 8. Cress.

	Mustard.		Cress.	
	Eight Days after Sowing.	Twelve Days after Sowing.	Eight Days after Sowing.	Twelve Days after Sowing.
Nitrate of Soda .	0	3	1	2
Chloride of Calcium .	6	12	2	8
Sulphate of Magnesia	6	9	7	7
Muriate of Ammonia	1	1	1	2
Nothing . . .	20	20	10	14
Phosphate of Ammonia	0	0	1	2
Water . . .	22	22	5	5
Common Salt . .	8	12	1	4

9. Lettuces and 10. Beans.

	Lettuces.	Beans.
	Twelve Days after Sowing.	Fourteen Days after Sowing.
Nitrate of Soda .	25	0
Chloride of Calcium .	35	0
Sulphate of Magnesia	30	13
Muriate of Ammonia	27	0
Nothing . . .	21	2
Phosphate of Ammonia	20	1
Water . . .	25	56
Common Salt . .	39	0

The whole series of experiments was made in rather unfavourable weather, being a period of unusual drought; this greatly checked the germination of the seeds, and in some instances retarded it for some weeks. The beans, No. 10, mostly came up in the course of the following fortnight, but those which had first come up, which had been steeped in water, retained their superiority to the last. The general results of these experiments, as far as they may be trusted, are rather against seed-steeping. As regards the wheat, barley and lettuces, it certainly seems as if the salts employed did accelerate germination, because in two cases, namely sulphate of magnesia and phosphate of ammonia, more than twice as many plants had come up than where no steeping or only water had been employed; we may therefore conclude that in these cases, the salts and not the water, produced the effect which was observed. In all the other experiments, however, the salts appear to have done more or less harm; at least the seeds which were steeped germinated less rapidly than those not steeped in saline solutions. In the case of the oats, peas, and mustard, the unsteeped seeds and those steeped in water alone, germinated most rapidly, the latter rather having the start of the former. In the rye and cress the unsteeped seeds germinated most rapidly, whilst those steeped in water were beaten by some of the saline solutions, and in the turnips and beans, those steeped in water came up first, whilst some of those prepared with saline solutions germinated sooner than the unprepared seeds.

The different salts acted differently on the various seeds employed: thus in the case of wheat and barley, sulphate of magnesia, and phosphate of ammonia, produced the best effect of all the salts employed; with turnips, lettuces and mustard, common salt and chloride of calcium acted best; with peas and beans, sulphate of magnesia had the greatest effect; with rye and cress, chloride of calcium and sulphate of magnesia were most advantageous; whilst with oats, all the salts employed, produced very little effect. It

is remarkable that throughout, nitrate of soda and muriate of ammonia decidedly retarded germination.

In these experiments the seeds were all left in steep the longest time which it was considered could be safely done; as it was however very desirable, also to make trial of the effects of steeping for different periods, the following experiment was made under the superintendence of Mr. Donald. One hundred and twenty-five seeds of *Lupinus Hartwegii* were divided into twenty-five parcels of five each, and each parcel differently prepared previous to sowing. One parcel was kept unsteeped; twelve were steeped for longer or shorter periods in a solution of phosphate of ammonia, formed by mixing one part of the saturated solution of the salt with four parts of water; and the remaining twelve in a solution of just half the strength, consisting of one part of the saturated solution diluted with nine parts of water. The following table shows the result of this experiment, the seeds being all sown on the same day.

Strength of Solution.	Hours in Steep.	Number Raised.	Days after Sowing.	Remarks.
	0	5	2	Very healthy
1 in 5 water . .	6	2	2	Very weak
1 in 5 do. . .	12	2	2	Do. do.
1 in 5 do. . .	18	1	3	Do. do.
1 in 5 do. . .	24	2	3	Do. do.
1 in 5 do. . .	30	1	3	Do. do.
1 in 5 do. . .	36	1	2	Do. do. died 2 days after
1 in 5 do. . .	42	2	4	weak
1 in 5 do. . .	48	2	3	do.
1 in 5 do. . .	52	0		
1 in 5 do. . .	58	0		
1 in 5 do. . .	64	0		
1 in 5 do. . .	168	0		
1 in 10 do. . .	6	3	2	healthy
1 in 10 do. . .	12	1	5	weak
1 in 10 do. . .	18	1	4	do.
1 in 10 do. . .	24	1	3	do.
1 in 10 do. . .	30	0		
1 in 10 do. . .	36	2	4	weak
1 in 10 do. . .	42	1	5	do.
1 in 10 do. . .	48	0		
1 in 10 do. . .	52	0		
1 in 10 do. . .	58	0		
1 in 10 do. . .	64	0		
1 in 10 do. . .	168	0		

This experiment, unlike those previously described, is certainly not in favour of the value of phosphate of ammonia as a steep; it is

however worthy of remark, that of the first series of Lupine seed steeped in the strong solution, 13 came up out of 60, whilst in the second series of those steeped in the weaker solution, only 9 came up out of 60. It is remarkable that the smaller quantity of the salt, seemed to do more harm than the larger.

Two distinct operations are very frequently spoken of under the general name of seed-steeping; the one consists in sinking the seeds in a considerable quantity of some liquid, the excess of which is poured off when it is judged the seeds have absorbed as much as is desirable; the second, when the seeds are soaked in a very small quantity of the solution, not more being used than they are able to absorb, so that there subsequently does not remain any liquid to be drained off, a quantity of dry lime or other powder being sifted upon the seeds and stirred up with them so as to dry the surface partially. It is evident that these two are very different operations and calculated to produce very different effects. By an operation of the first sort, light, blighted, and worthless grains which rise to the surface may be readily separated from the sound seeds, and the eggs of insects may be destroyed, which if sown with the seed might soon hatch and destroy the young plants. In the second process these effects are not attained; the seeds as in the first-mentioned plan absorb a certain quantity of a solution, and in addition are externally coated with a small quantity of lime, or some other dry substance, which in a soil deficient in the substance employed may constitute a useful and valuable manure; whilst at the same time when lime is employed, it will probably defend the seeds from any insects in the soil.

It is evident that the value of any steep or process of preparing seed, will in great part depend on the nature of the soil where the seed is sown, and the weather or peculiar conditions of the season when it is used. It must always be remembered that no process of steeping can possibly replace the use of manure; if by steeping the seed we are enabled to obtain from the soil a larger crop than

we should otherwise have had, it is certain that the crop of the next year will suffer in proportion. The only chemical effect of seed-steeping must be to cause germination to proceed more rapidly and give increased vigour to the young plant, and consequently to require a larger supply of earthy matters from the soil. The experiments made this year at the Gardens of the Society, must be received with some allowance, as having been carried on in a peculiarly unfavourable season; they possess however considerable interest, and as far as they go may be relied on as accurate.

Bedford Row,
15*th January,* 1845.

Mean Height of the Barometer in 1843.

Mean and Extremes of Temperature and Mean of the Dew Point in 1843.

Monthly depth of Rain in 1843.

X. *Journal of Meteorological Observations made in the Garden of the Horticultural Society at Chiswick during the year* 1843. *By Mr.* ROBERT THOMPSON.

This Journal has been kept on the same plan as the preceding.

JANUARY.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	30.257	34	34	—	Clear and fine	30.220	40	40	—	Clear & fine	30.131	31	31	—	Clear & frosty
M.	2	—.027	30	30	—	Frosty	—.017	36	36	—	Ditto	—.086	31	31	—	Ditto
T.	3	—.196	24	24	—	Ditto	—.205	35	35	—	Ditto	—.107	34	34	—	Overcast
W.	4	29.884	41	41	—	Rain	29.894	43	43	—	Rain	29.977	34	34	—	Clear
Th.	5	—.871	35	35	—	Clear	—.772	40	40	—	Do. & Sleet	30.060	35	35	—	Ditto
F.	6	30.070	32	32	—	Frosty	30.080	40	36	4	Overcast	29.997	41	41	—	Cloudy
S.	7	29.917	39	39	—	Overcast	29.825	45	44	1	Cloudy	—.589	45	45	—	Ditto
☽ S.	8	—.377	36	36	—	Showery	—.352	41	39	2	Ditto & Fine	—.311	34	34	—	Overcast
M.	9	—.659	32	32	—	Clear & frosty	—.651	39	39	—	Overcast	—.206	45	45	—	Stormy with rain
T.	10	—.861	40	40	—	Stormy & wet	—.189	43	36	7	Boisterous	—.068	36	36	—	Fine
W.	11	—.108	31	31	—	Clear & frosty	—.073	40	34	6	Very Fine	28.796	33	33	—	Overcast
Th.	12	28.706	33	33	—	Hazy	28.884	36	36	—	Hazy	29.120	28	28	—	Clear
F.	13	—.406	41	41	—	Stormy & wet	—.181	45	45	—	Very boisterous	28.649	40	40	—	Boisterous
S.	14	29.030	34	30	4	Clear & windy	—.965	38	38	—	Densely overcast	—.700	35	35	—	Do. snow
S.	15	28.895	32	32	—	Cloudy	—.826	37	37	—	Clear & fine	29.070	31	31	—	Clear & frosty
○ M.	16	29.310	37	35	2	Cold & dry	29 548	41	41	—	Fine	—.942	38	38	—	Overcast
T.	17	30.182	34	34	—	Overcast	30.195	41	41	—	Overcast	30 192	43	43	—	Ditto
W.	18	—.326	42	42	—	Hazy	—.362	50	50	—	Ditto	—.454	37	37	—	Dense fog
Th.	19	—.502	34	34	—	Dense fog	—.482	40	40	—	Dense fog	—.438	42	42	—	Foggy
F.	20	—.310	39	39	—	Hazy	—.237	40	40	—	Hazy	—.086	37	37	—	Ditto
S.	21	—.008	32	32	—	Foggy	—.016	36	36	—	Ditto	—.030	39	39	—	Overcast
S.	22	—.038	39	39	—	Overcast	—.003	44	44	—	Ditto	—.015	42	42	—	Ditto
☾ M.	23	—.027	42	42	—	Very Fine	29.980	46	46	—	Overcast	29.892	44	44	—	Stormy, rain
T.	24	29.858	45	45	—	Thickly Overcast	—.837	48	48	—	Ditto	—.869	46	46	—	Fine
W.	25	—.999	40	40	—	Fine	30.025	49	45	4	Very fine	30.059	47	47	—	Ditto
Th.	26	30.025	45	45	—	Overcast	—.010	52	52	—	Cloudy	—.038	48	48	—	Densely overcast
F.	27	29.959	50	50	—	Densely ditto	29.901	53	53	—	Ditto	29.911	54	54	—	Ditto
S.	28	—.776	55	55	—	Cloudy	—.772	53	53	—	Slightly Overcast	—.907	48	48	—	Clear & fine
S.	29	—.911	50	50	—	Overcast	—.902	55	55	—	Ditto	—.826	52	52	—	Overcast
● M.	30	—.735	50	50	—	Ditto	—.724	55	51	4	Very fine	—.905	42	42	—	Clear
T.	31	—.931	42	42	—	Uniformly do.	—.875	50	50	—	Slight drizzle	—.834	50	50	—	Stormy, rain
		29.779	38.38	38.19	0.19		29.771	43.58	42.68	0.90		29.750	40.06	40.06	0.00	

JANUARY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	41	25	46	21	N	Little	
2	38	19	40	13	NW	Ditto	
3	43	27	43	22	SW	Ditto	
4	43	29	43	25	W	Ditto	.12
5	41	31	44	26	——	Brisk	
6	41	34	41	30	——	Little	.01
7	46	36	46	34	——	Brisk	.14
8	42	30	43	25	SW	Ditto	
9	47	32	47	31	——	Little	:09
10	42	30	44	26	W	Strong	.06
11	40	31	43	29	SW	Little	.16
12	43	23	42	19	N	Ditto	.29
13	46	37	48	31	SW	Strong	.04
14	39	28	40	24	——	Brisk	.16
15	40	26	40	23	W	Little	
16	41	30	44	26	NW	Brisk	
17	42	37	42	35	SW	Ditto	.03
18	49	33	50	31	——	Little	
19	44	34	44	33	S	Ditto	.01
20	39	29	43	25	E	Ditto	.04
21	41	34	42	28	S	Ditto	
22	44	34	46	30	SW	Ditto	.02
23	48	43	52	41	S	Ditto	.05
24	48	39	48	36	SW	Ditto	.02
25	49	44	50	42	——	Ditto	
26	51	45	51	43	——	Ditto	
27	53	50	54	48	——	Brisk	
28	56	45	58	43	W	Ditto	.02
29	55	48	57	46	——	Ditto	
30	55	36	59	33	——	Ditto	
31	51	44	52	42	SW	Ditto	.07
	45.09	34.25	43.51	31.00			1.33

Remarks.

The temperature of this month was about 3½ degrees above the average. The barometer was exceedingly low between the 10th and 15th. On the 13th the pressure of the atmosphere balanced little more than 28 inches of mercury. The day was very boisterous and there was a violent hurricane at night; but, considering the circumstances, the quantity of rain was comparatively little. The total amount of rain during the month was also below the average, and did not correspond as usual with the lowness of the barometer. West and south west winds were prevalent.

Mean Pressure from the 3 daily observations	29.766 inches.
—— Temperature .... Ditto......	40°.67
—— Dew Point .... Ditto......	40°.31
—— Degree of Dryness ..... Ditto......	0°.36
—— Degree of Moisture .... Ditto......	.973
—— Force of Vapour .... Ditto......	.253 inch.
Least observed degree of Moisture	.800
Maximum Temperature in the Shade	56°.
Minimum Temperature in ditto	19°.
Maximum Temperature in the Sun	59°.
Minimum of Terrestrial Radiation	13°.
Mean Temperature of External Air	39°.67.

WINDS.

North...... 2 days	N. East...... 0 days
South...... 3 ..	S. East ...... 0 ..
East........ 1 ..	N. West ..... 2 ..
West....... 9 ..	S. West ......14 ..

31 days.

Amount of Rain ....1.33 inch.

FEBRUARY.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
W.	1	29.902	44	44	—	Very Fine	29.894	52	50	2	Cloudy	29.833	48	48	—	Clear
Th.	2	—.612	44	44	—	Heavy rain	—.627	45	45	—	Drizzly	—.742	42	42	—	Overcast
F.	3	—.517	39	39	—	Showery	—.192	36	36	—	Stormy showers	—.130	33	33	—	Boisterous
S.	4	—.348	34	34	—	Stormy	—.351	39	39	—	Do. boisterous	—.757	34	34	—	Stormy
S.	5	—.840	31	27	4	Clear, frosty	—.798	38	29	9	Clear, frosty	—.854	31	31	—	Clear
M.	6	—.868	32	30	2	Overcast	—.736	39	39	—	Cloudy	—.818	34	34	—	Overcast
☽ T.	7	—.960	33	33	—	Hazy	—.993	39	39	—	Hazy	—.890	34	34	—	Sleet
W.	8	30.024	35	35	—	Dense fog	30.038	38	38	—	Ditto & cold	30.025	38	38	—	Ditto
Th.	9	29.966	37	37	—	Hazy	29.956	40	40	—	Easterly haze	29.892	37	37	—	Densely overcast
F.	10	—.881	35	35	—	Cloudy	—.838	40	33	7	Dense clouds	—.831	35	35	—	Cloudy
S.	11	—.859	37	36	1	Uniformly overcast	—.883	41	40	1	Hazy	—.976	39	39	—	Very fine
S.	12	30.040	35	35	—	Slight drizzle	30.030	41	40	1	Ditto	30.040	38	38	—	Ditto
M.	13	—.010	30	30	—	Frosty	29.952	39	34	5	Ditto	29.873	26	26	—	Frosty
○ T.	14	29.721	27	27	—	Sharp frost	—.646	39	39	—	Cloudy	—.613	29	29	—	Overcast
W.	15	—.470	24	20	4	Do. and overcast	—.395	29	29	—	Snow flakes	—.294	26	26	—	Sharp frost
Th.	16	—.205	24	15	9	Dry and frosty	—.193	32	19	13	Slightly overcast	—.234	29	29	—	Overcast
F.	17	—.470	25	20	5	Clear and Do.	—.502	37	25	12	Very fine	—.420	33	33	—	Stormy
S.	18	—.400	32	32	—	Stormy	—.410	34	34	—	Drifting snow	—.425	34	34	—	Ditto
S.	19	—.417	33	33	—	Overcast	—.355	36	36	—	Stormy, rain	—.311	37	37	—	Heavy rain
M.	20	—.267	37	37	—	Rain	—.261	40	40	—	Hazy	—.324	38	38	—	Foggy
☾ T.	21	—.371	38	38	—	Foggy	—.362	49	49	—	Fine	—.326	41	41	—	Ditto
W.	22	—.246	44	44	—	Slight rain	—.298	51	51	—	Cloudy	—.351	45	45	—	Cloudy
Th.	23	—.449	44	44	—	Cloudy	—.455	51	50	1	Very fine	—.519	41	41	—	Overcast
F.	24	—.612	38	38	—	Foggy	—.624	41	41	—	Easterly haze	—.640	38	38	—	Hazy
S.	25	—.619	35	35	—	Overcast	—.596	38	38	—	Slight drizzle	—.609	34	34	—	Very stormy
S.	26	—.601	35	35	—	Sleet	—.533	39	39	—	Overcast	—.326	35	35	—	Slight drizzle
M.	27	28.933	36	36	—	Rain	28.848	41	41	—	Stormy & wet	28.869	39	39	—	Rain
T.	28	29.004	39	39	—	Cloudy	29.163	42	42	—	Cloudy	29.434	38	38	—	Overcast
		29.582	34.89	34.00	0.89		29.569	40.21	38.39	1.82		29.584	33.78	33.78	0.0	

FEBRUARY.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	53	45	57	44	W	Brisk	.16
2	45	37	46	33	——	Little	
3	45	24	47	18	SW	Strong	.20
4	39	30	41	26	N	Ditto	.16
5	39	29	43	23	——	Brisk	.08
6	38	31	39	25	——	Little	.09
7	37	32	39	29	NE	Ditto	.26
8	38	35	38	33	——	Ditto	.02
9	39	34	40	32	——	Ditto	.11
10	42	31	48	27	——	Ditto	
11	41	36	41	35	——	Ditto	
12	41	27	47	22	——	Ditto	.01
13	42	18	48	12	E	Ditto	
14	39	16	48	10	W	Ditto	
15	29	22	31	16	N	Ditto	
16	32	20	33	11	NE	Brisk	
17	42	30	47	28	——	Little	.16
18	34	31	34	28	E	Strong	.04
19	37	34	37	32	——	Brisk	.28
20	39	35	39	31	——	Little	.16
21	54	37	61	35	SE	Ditto	.12
22	52	41	53	36	S	Ditto	.02
23	53	37	53	33	E	Ditto	
24	43	34	43	32	——	Ditto	
25	38	32	40	31	NE	Ditto	.26
26	40	34	45	32	E	Ditto	.03
27	40	37	41	35	NE	Brisk	.19
28	41	31	40	27	——	Ditto	
	41.14	31.43	43.52	27.71			2.35

Remarks.

The weather was generally stormy and wet; and although there were no very severe frosts, yet a low temperature prevailed, so that the average was nearly 4° below that of the month. The barometer did not fall so extremely low as it did in several instances in the preceding month; but the average height was considerably below that of any month since April 1829. In that month the amount of rain was 2 inches 8-10ths above the usual quantity; but in the present it was only $\frac{3}{4}$ of an inch above the average. The 4th was stormy and boisterous; as was also the 18th, with drifting snow and keen east wind.

Mean Pressure from the 3 daily observations 29.578 inches.
—— Temperature .... Ditto ...... 36°.29
—— Dew Point .... Ditto ...... 35°.39
—— Degree of Dryness .... Ditto ...... 0°.90
—— Degree of Moisture .. Ditto ...... .968
—— Force of Vapour .... Ditto ...... .211 inch.
Least observed degree of Moisture ...... .600
Maximum Temperature in the Shade .... 56°.
Minimum Temperature in ditto .... 19°.
Maximum Temperature in the Sun ...... 59°.
Minimum of Terrestrial Radiation ...... 13°.
Mean Temperature of External Air ...... 36°.28

Winds.

North ...... 4 days	N. East.....11 days
South .... 1 ..	S. East.......1 ..
East......... 7 ..	N. West......0 ..
West .... 3 ..	S. West...... 1 ..

28 days.

Amount of Rain................2.35 inches.

MARCH.

1843.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
● W.	1	29.676	32	32	—	Clear	29.779	38	38	--	Snow flakes	29.851	33	33	—	Cloudy
Th.	2	—.961	32	32	—	Do. and frosty	—.968	40	38	2	Fine	30.029	33	33	—	Clear
F.	3	30.072	31	30	1	Overcast	30.070	40	28	12	Clear & ditto	—.159	27	27	—	Ditto
S.	4	—.298	33	33	—	Ditto	—.347	41	33	8	Cloudy, fine	—.378	27	27	—	Clear & frosty
S.	5	—.360	28	28	—	Sharp frost	—.370	43	30	13	Ditto	—.331	34	33	1	Cloudy
M.	6	—.269	36	34	2	Overcast	—.245	43	40	3	Cloudy	—.231	33	33	—	Clear
T.	7	—.295	27	27	—	Frosty & foggy	—.182	42	42	—	Easterly haze	—.197	32	32	—	Foggy
W.	8	—.264	35	35	—	Light clouds	—.289	43	33	10	Fine	—.328	31	31	—	Clear & frosty
☽ Th.	9	—.380	35	32	3	Dry haze	—.348	39	35	4	Hazy	—.318	30	30	—	Frosty
F.	10	—.176	36	36	—	Hazy	—.096	43	42	1	Overcast	—.050	38	38	—	Overcast
S.	11	—.134	40	30	10	Slight haze	—.153	47	34	13	Ditto	—.086	41	41	—	Ditto & fine
S.	12	29.943	42	42	—	Uniformly overcast	29.854	51	45	6	Ditto	29.700	47	47	—	Ditto
M.	13	—.725	39	39	—	Clear	—.698	50	42	8	Cloudy & fine	—.585	45	44	1	Ditto
T.	14	—.426	49	49	—	Fine	—.513	54	54	—	Cloudy	—.605	48	48	—	Ditto
W.	15	—.715	50	50	—	Hazy	—.852	53	47	6	Ditto & fine	—.924	49	49	—	Foggy
⊙ Th.	16	—.986	51	51	—	Do. and mild	—.960	58	50	8	Very Fine	—.940	41	41	—	Clear and fine
F.	17	—.891	38	38	—	Foggy	—.858	60	53	7	Clear and do.	—.836	40	40	—	Ditto
S.	18	—.844	38	38	—	Ditto	—.848	60	49	11	Very Fine	—.861	46	46	—	Slight fog
S.	19	—.771	45	45	—	Ditto	—.867	50	50	—	Foggy	—.816	44	44	—	Overcast
M.	20	—.667	43	43	—	Ditto	—.563	60	58	2	Very Fine	—.473	52	52	—	Rain
T.	21	—.467	49	49	—	Fine	—.421	56	56	—	Ditto	—.379	51	51	—	Very Fine
☾ W.	22	—.379	51	51	—	Hazy	—.409	62	62	—	Ditto	—.341	52	52	—	Ditto
Th.	23	—.416	52	52	—	Cloudy	—.517	56	50	6	Cloudy & mild	—.555	47	47	—	Clear and fine
F.	24	—.538	51	51	—	Hazy clouds	—.563	61	50	11	Fine	—.699	49	49	—	Ditto
S.	25	—.734	46	43	3	Light clouds	—.697	51	41	10	Dry & windy	—.713	44	36	8	Clear
S.	26	—.756	42	32	10	Cold & dry	—.710	48	34	14	Clear and do.	—.723	40	34	6	Ditto
M.	27	—.719	38	33	5	Dry cold haze	—.715	43	35	8	Cloudy & cold	—.700	38	36	2	Overcast
T.	28	—.722	42	40	2	Hazy clouds	—.745	49	35	14	Cold & cloudy	—.822	33	33	—	Clear, frosty
W.	29	—.932	39	38	1	Clear	—.950	54	39	15	Dry cold haze	—.950	39	39	—	Clear
● Th.	30	—.848	45	43	2	Hazy	—.768	57	53	4	Overcast and fine	—.602	51	51	—	Overcast
F.	31	—.451	53	53	—	Cloudy, Fine	—.384	58	58	—	Cloudy	—.455	49	49	—	Clear and Fine
		29.865	40.90	39.64	1.26		29.862	50.00	43.68	6.32		29.859	40.77	40.19	0.58	

MARCH.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	40	23	50	17	NE	Little	
2	42	24	50	17	——	Ditto	
3	42	30	52	26	N	Ditto	
4	41	18	42	12	——	Ditto	
5	46	31	52	28	SW	Ditto	
6	44	20	50	14	S	Ditto	
7	46	24	52	18	E	Ditto	
8	45	28	51	24	NE	Ditto	
9	38	24	39	18	SE	Ditto	
10	44	28	45	23	S	Ditto	
11	47	40	50	38	SW	Ditto	
12	50	32	54	28	——	Ditto	
13	52	43	55	41	——	Brisk	.06
14	56	45	60	44	W	Ditto	
15	57	45	61	43	NW	Little	.06
16	57	29	62	44	S	Ditto	
17	64	31	69	25	SW	Ditto	
18	67	36	72	31	——	Ditto	
19	55	41	60	38	E	Ditto	
20	63	45	71	40	——	Ditto	.04
21	59	47	67	45	S	Ditto	.21
22	61	46	63	44	——	Ditto	.02
23	60	42	60	38	——	Ditto	
24	64	41	72	36	——	Ditto	
25	55	36	60	27	E	Brisk	
26	51	36	57	32	——	Ditto	
27	46	38	53	34	——	Ditto	
28	51	28	59	21	——	Ditto	
29	56	29	63	23	——	Little	
30	54	42	78	39	S	Ditto	
31	58	46	62	44	——	Ditto	.08
	51.96	34.45	54.54	30.70			0.47

Remarks.

The weather was very seasonable throughout this month, and highly favourable for the operations of the garden. The average temperature was maintained. The amount of rain was scarcely half an inch. Fogs were more prevalent than is usually the case at this period of the season. Sharp frosts were of frequent occurrence in the first part of the month; those on the night of the 4th and 6th were fully as severe as any in the two preceding months.

Mean Pressure from the 3 daily observations 29.862 inches.
—— Temperature .... Ditto ...... 43°.91
—— Dew Point .... Ditto ...... 41°.17
—— Degree of Dryness ... Ditto ...... 2°.74
—— Degree of Moisture .. Ditto ...... .903
—— Force of Vapour ..... Ditto ...... .261 inch.
Least observed degree of Moisture ...... .577
Maximum Temperature in the Shade .... 67°.
Minimum Temperature in ditto .... 18°.
Maximum Temperature in the Sun ...... 78°.
Minimum of Terrestrial Radiation ...... 12°.
Mean Temperature of External Air ..... 43°.20

Winds.

North ...... 2 days	N. East...... 3 days
South ...... 9 ..	S. East...... 1 ..
East .... 8 ..	N. West...... 1 ..
West....... 1 ..	S. West ..... 6 ..

31 days.

Amount of Rain.................. 0.47 inch.

APRIL.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.484	51	51	—	Rain	29.490	58	58	—	Cloudy	29 500	52	52	—	Overcast
S.	2	—.452	54	54	—	Cloudy	—.500	58	58	—	Ditto	—.649	50	50	—	Clear and fine
M.	3	—.768	54	54	—	Slight rain	—.798	61	55	6	Ditto & fine	—.572	49	49	—	Ditto
T.	4	—.379	52	52	—	Rain	—.305	58	58	—	Rain	—.553	48	48	—	Cloudy, windy
W.	5	—.702	49	48	1	Fine	—.772	52	52	—	Cloudy	—.917	44	44	—	Clear
Th.	6	—.843	49	49	—	Overcast	—.707	56	56	—	Ditto	—.646	51	51	—	Slight rain
☽ F.	7	—.563	53	53	—	Rain	—.520	61	59	2	Ditto	—.436	50	50	—	Clear and fine
S.	8	—.544	48	48	—	Clear	—.553	55	45	10	Fine	—.573	45	45	—	Ditto
S.	9	—.598	46	41	5	Easterly haze	—.598	45	42	3	Overcast	—.703	38	38	—	Cloudy
M.	10	—.892	39	33	6	Clear	—.898	42	42	—	Fine	—.921	34	34	—	Clear
T.	11	—.978	36	30	6	Frosty, clear	—.971	46	24	22	Clear & dry	—.983	31	31	—	Frosty
W.	12	—.949	37	33	4	Clear	—.924	45	25	20	Cloudy	—.829	33	33	—	Ditto
Th.	13	—.797	36	36	—	Snow clouds	—.848	45	33	12	Ditto & fine	—.983	31	31	—	Ditto
○ F.	14	—.914	43	38	5	Uniformly overcast	—.950	58	58	—	Ditto	30.006	48	48	—	Overcast
S.	15	30.101	51	51	—	Hazy	30.091	60	45	15	Overcast	—.108	52	51	1	Do. & mild
S.	16	29.992	54	50	4	Light haze	29.854	59	50	9	Hazy, fine	29.818	51	51	—	Overcast
M.	17	—.854	51	48	3	Ditto	—.889	63	50	13	Very fine	30.048	49	49	—	Clear and fine
T.	18	30.140	52	47	5	Ditto	30.079	63	37	26	Very dry	29.980	50	48	2	Ditto
W.	19	29.959	46	46	—	Ditto	29.884	58	41	17	Dry haze	—.766	48	48	—	Ditto
Th.	20	—.690	59	55	4	Very Fine	—.711	67	59	8	Very fine	—.778	51	51	—	Ditto
☾ F.	21	—.846	51	50	1	Ditto	—.849	64	48	16	Ditto	—.833	50	50	—	Overcast
S.	22	—.815	54	54	—	Rain	—.894	50	50	—	Showery	—.989	51	51	—	Clear
S.	23	30.043	49	45	4	Light Clouds	30.040	54	42	12	Cloudy, fine	30.025	43	43	—	Ditto
M.	24	—.012	50	45	5	Ditto & fine	29.990	59	43	16	Hazy clouds	29.994	33	33	—	Ditto
T.	25	29.759	46	46	—	Thickly overcast	30.070	48	48	—	Rain	—.648	40	40	—	Ditto
W.	26	—.626	39	39	—	Cold rain	29.677	51	36	15	Very fine	—.644	40	40	—	Rain
Th.	27	—.798	45	45	—	Cloudy	—.674	54	40	14	Cloudy, fine	—.892	43	43	—	Clear
F.	28	—.779	49	48	1	Overcast	—.707	52	52	—	Slight rain	—.669	48	48	—	Overcast
● S.	29	—.681	49	49	—	Ditto	—.677	56	45	11	Cloudy, fine	—.729	49	49	—	Do. & fine
S.	30	—.784	57	50	7	Fine	—.838	65	53	12	Light clouds	—.929	54	49	5	Clear and dry
		29.791	48.50	46.26	2.04		29.792	55.10	46.47	8.63		29.820	44.88	44.60	0.26	

APRIL.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	59	50	62	47	SW	Brisk	.18
2	59	48	68	45	——	Ditto	.05
3	61	46	71	42	——	Ditto	.22
4	57	41	67	35	S	Little	.23
5	56	38	72	34	W	Brisk	.02
6	55	51	58	49	SW	Ditto	.01
7	62	44	71	42	——	Brisk	.35
8	59	39	75	33	W	Ditto	.01
9	47	32	52	27	E	Little	
10	50	26	60	20	N	Brisk	.01
11	49	22	60	16	——	Ditto	
12	48	28	62	23	NE	Little	.04
13	48	24	55	18	N	Ditto	
14	54	42	58	39	NE	Ditto	
15	58	47	61	46	SW	Ditto	
16	63	42	70	38	E	Ditto	
17	65	33	78	28	NE	Ditto	
18	67	35	74	29	E	Ditto	
19	63	41	70	37	——	Ditto	
20	70	36	80	32	SW	Ditto	
21	65	45	80	41	——	Ditto	.05
22	59	26	70	20	——	Brisk	.03
23	60	28	70	21	S	Little	
24	60	27	69	20	E	Ditto	
25	56	34	60	32	S	Ditto	.30
26	57	34	65	32	W	Ditto	.08
27	60	33	70	27	——	Ditto	
28	54	40	60	36	S	Brisk	.04
29	59	43	70	39	NE	Ditto	
30	69	49	75	45	E	Brisk	
	58.30	37.47	67.10	33.10			1.62

Remarks.

The mean temperature was a little above the average; but frosts at night were of frequent occurrence. On the night of the 11th the thermometer indicated 10° below freezing. Plums and cherries were then in full flower, as were likewise some of the early flowering varieties of Pears. The leaves however were so far advanced as to afford the blossoms a little protection, and enough was saved for a crop. The day was clear, and the air very dry, as is usually the case before late frosts. Between the 22nd and 24th the nights were also frosty, but not so severe as to do any material injury to vegetation. There was a heavy shower of hail on the afternoon of the 5th.

Mean Pressure from the 3 daily observations 29.801 inches.
—— Temperature .... Ditto ...... 49°.42
—— Dew Point .... Ditto ...... 45°.78
—— Degree of Dryness ... Ditto ...... 3°.64
—— Degree of Moisture .. Ditto ...... .878
—— Force of Vapour. .... Ditto ...... .310 inch.
Least observed degree of Moisture .... .394
Maximum Temperature in the Shade ...... 70°.
Minimum Temperature in ditto .... 22°.
Maximum Temperature in the Sun ...... 80°.
Minimum of Terrestrial Radiation ...... 16°.
Mean Temperature of External Air ...... 47°.88

WINDS.

North.....	3 days	N. East......	4 days
South......	4 ..	S. East.......	0 ..
East.......	6 ..	N. West.....	0 ..
West.......	4 ..	S. West......	9 ..

30 days.

Amount of Rain...................... 1.62 inch.

MAY.

1843.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
M.	1	30.065	52	50	2	Fine	30.072	66	53	13	Cloudless	30.140	54	50	4	Cold & dry
T.	2	—.124	55	50	5	Slight haze	—.053	67	46	21	Fine	—.004	50	46	4	Ditto
W.	3	29.891	47	45	—	Overcast	29.820	62	55	7	Very Fine	29.778	50	48	2	Cloudy
Th.	4	—.768	57	55	2	Cloudy, Fine	—.725	63	52	11	Ditto	—.680	50	50	—	Rain
F.	5	—.676	58	58	—	Rain	—.664	62	57	5	Cloudy & do.	—.662	51	51	—	Cloudy
S.	6	—.258	48	48	—	Heavy rain	—.491	40	40	—	Heavy rain	—.623	41	41	—	Clear & cold
☽ S.	7	—.611	50	45	5	Clear & Fine	—.638	54	48	6	Cloudy	—.601	44	44	—	Showery
M.	8	—.579	46	46	—	Hazy	—.558	47	47	—	Heavy rain	—.521	44	44	—	Rain
T.	9	—.604	47	47	—	Drizzly	—.671	56	56	—	Cloudy	—.861	46	46	—	Cloudy & fine
W.	10	—.983	52	52	—	Slight haze	30.027	56	50	6	Ditto	30.136	44	44	—	Clear & ditto
Th.	11	30.184	48	48	—	Hazy	—.178	56	49	7	Light haze	—.165	48	48	—	Ditto
F.	12	—.159	56	48	8	Ditto, Fine	—.098	66	50	16	Very Fine	29.879	53	53	—	Overcast
○ S.	13	29.894	53	53	—	Overcast	29.904	63	53	10	Light clouds	—.858	48	48	—	Very Fine
S.	14	—795	60	54	6	Ditto and Fine	—.717	70	50	20	Cloudy & fine	—.552	52	52	—	Heavy rain
M.	15	—.498	58	58	—	Cloudy	—.509	63	63	—	Showery	—.497	52	52	—	Rain
T.	16	—.389	55	55	—	Drizzly	—.386	60	54	6	Ditto	—.497	52	52	—	Ditto
W.	17	—.476	56	56	—	Hazy	—.522	61	61	—	Heavy showers	—.671	48	48	—	Showery
Th.	18	—.798	49	49	—	Densely overcast	—.848	49	49	—	Cold rain	—.901	46	46	—	Ditto
F.	19	—.888	49	49	—	Cold rain	—.886	59	51	8	Cloudy	—.893	49	49	—	Fine
S.	20	—.830	55	52	3	Cloudy & Fine	—.803	60	55	5	Ditto	—.641	50	50	—	Showery
☾ S.	21	—.649	61	61	—	Fine	—.637	59	59	—	Heavy rain	—.647	48	48	—	Clear
M.	22	—.662	57	57	—	Ditto	—.653	60	60	—	Heavy showers	—.687	51	51	—	Cloudy
T.	23	—.702	59	59	—	Ditto	—.784	64	55	9	Cloudy	—.616	54	54	—	Lightning, rain
W.	24	—.479	55	55	—	Heavy rain	—.524	68	68	—	Ditto	—.553	49	49	—	Clear & fine
Th.	25	—.605	58	55	3	Cloudy	—.625	65	55	—	Do. & Fine	— 677	51	51	—	Ditto
F.	26	—.697	59	55	4	Ditto	—.664	61	61	—	Rain	—.547	44	44	—	Ditto
S.	27	—.535	59	59	—	Overcast	—.452	65	65	—	Showery	— 433	50	50	—	Ditto
S.	28	—.520	56	56	—	Showery	—.533	61	61	—	Ditto	—.802	49	49	—	Overcast
● M.	29	—.912	51	51	—	Slight drizzle	—.931	51	51	—	Hazy	30.032	42	42	—	Light haze
T.	30	30.084	54	54	—	Light haze	—.953	60	48	12	Very Fine	—.060	51	51	—	Showery
W.	31	29.854	61	61	—	Overcast	—.849	68	60	8	Cloudy & mild	29.813	58	58	—	Overcast
		29.750	54.00	52.78	1.22		29.747	59.74	54.26	5.48		29.754	49.00	48.68	0.32	

MAY.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	70	42	80	36	E	Brisk	
2	69	40	85	35	——	Little	
3	66	44	80	39	NE	Ditto	.06
4	66	45	72	41	SW	Ditto	.16
5	63	42	70	36	——	Brisk	1.26
6	53	32	55	27	W	Little	.38
7	59	29	65	26	S	Ditto	.05
8	49	42	49	38	E	Ditto	.57
9	54	39	66	34	NE	Ditto	.02
10	57	33	65	28	E	Ditto	
11	62	34	70	28	NE	Ditto	
12	67	46	73	43	SW	Ditto	.02
13	66	42	72	38	W	Ditto	
14	64	50	72	48	S	Ditto	.18
15	65	47	71	45	SW	Brisk	.14
16	62	50	71	47	NE	Little	.07
17	52	43	50	40	——	Ditto	.20
18	48	45	51	42	——	Ditto	.04
19	60	46	66	42	——	Brisk	.02
20	62	48	65	47	E	Ditto	.44
21	64	39	68	34	S	Little	.05
22	56	45	68	34	SW	Ditto	.09
23	63	52	70	50	SE	Ditto	.53
24	68	44	74	42	S	Ditto	.06
25	67	41	75	37	SW	Ditto	.03
26	66	45	75	41	——	Brisk	.20
27	63	43	68	41	——	Ditto	.14
28	65	44	72	39	W	Little	.16
29	54	34	54	32	E	Ditto	.30
30	64	48	72	48	S	Ditto	.03
31	67	54	70	51	W	Ditto	.06
	61.64	42.83	68.19	39.00			5.26

Remarks.

This month was excessively wet, almost sunless, with a temperature more than 3 degrees below the average. There were only 5 days on which rain did not fall. The quantity which fell on the 5th, fully $1\frac{1}{4}$ inch, was greater than had fallen at the garden in any one day since the register was kept; and the total amount exceeded that in any month since July 1834. The barometer averaged very low. Lightning, and very heavy showers of rain, occurred on the evening of the 23rd. The night of the 25th was very clear, and a greater number of shooting stars were observed than is usual at this period of the season.

Mean Pressure from the 3 daily observations	29.750 inches
—— Temperature . . . . Ditto . . .	54°.24
—— Dew Point . . . . Ditto . . .	51°.90
—— Degree of Dryness . . . . Ditto . . .	2°.34
—— Degree of Moisture . . . . Ditto . . .	.919
—— Force of Vapour . . . . Ditto . . .	.386 inch.
Least observed degree of Moisture	.497
Maximum Temperature in the Shade	70°.
Minimum Temperature in ditto	29°.
Maximum Temperature in the Sun	85°.
Minimum of Terrestrial Radiation	26°.
Mean Temperature of External Air	52°.23

WINDS.

North	0 days	N. East	7 days
South	5 ..	S. East	1 ..
East	6 ..	N. West	0 ..
West	4 ..	S. West	8 ..

31 days.

Amount of Rain . . . . 5.26 inches.

JUNE.

1843.	Days.	Morning.					Noon.					Night.				
		Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
Th.	1	29.669	63	63	—	Overcast	29.624	66	66	—	Cloudy	29.504	58	58	—	Cloudy & fine
F.	2	—.293	59	59	—	Rain	—.305	63	58	5	Dense clouds	—.224	55	55	—	Boisterous, rain
S.	3	—.522	60	60	—	Cloudy	—467	66	58	8	Cloudy, fine	—.575	50	50	—	Clear & Fine
S.	4	—.625	60	60	—	Very Fine	—639	64	61	3	Showery	—.223	51	51	—	Ditto
☽ M.	5	—.780	58	50	8	Fine	—.785	59	59	—	Ditto	—.784	49	49	—	Ditto
T.	6	—.789	57	57	—	Cloudy & Do.	—.793	57	57	—	Ditto	—.861	50	50	—	Showery
W.	7	—.896	54	50	4	Fine	—.853	56	56	—	Rain	—.671	53	53	—	Ditto
Th.	8	—.407	57	57	—	Cloudy	—.376	63	63	—	Showery	—.256	51	51	—	Boisterous, heavy rain
F.	9	—.346	58	58	—	Ditto & windy	—.449	60	58	2	Do. & Boisterous	—.642	53	53	—	Overcast
S.	10	—.749	59	52	7	Fine	—.810	62	62	—	Rain	—.937	53	53	—	Showery
S.	11	30.040	57	57	—	Cloudy	30.045	59	50	9	Cloudy, fine	30.045	52	52	—	Clear & fine
○ M.	12	—.014	54	54	—	Hazy clouds	29.989	59	59	—	Slight Rain	29.969	53	53	—	Overcast
T.	13	29.843	49	49	—	Heavy rain	—.792	56	56	—	Heavy Rain	—.810	54	54	—	Drizzly
W.	14	—.907	60	60	—	Foggy	—.940	62	62	—	Cloudy	—.974	59	59	—	Foggy
Th.	15	—.962	64	64	—	Hazy	—.969	69	56	13	Fine	—.959	53	53	—	Clear
F.	16	—.931	62	54	8	Very Fine	—.926	71	52	19	Ditto	—.960	54	54	—	Ditto
S.	17	—.979	62	58	4	Overcast	—.973	73	59	14	Very Fine	—.972	54	54	—	Cloudy
S.	18	—.929	60	57	3	Hazy, fine	—.890	64	64	—	Overcast, fine	—.823	64	64	—	Do. & fine
☾ M.	19	—.824	56	53	3	Uniformly overcast	—.850	63	57	6	Overcast	—.954	52	52	—	Overcast
T.	20	—.956	53	50	3	Densely clouded	30.113	57	48	9	Cloudy	30.160	50	50	—	Ditto
W.	21	30.128	59	51	8	Very Fine	—.065	69	49	20	Very Fine	29.984	59	59	—	Ditto & fine
Th.	22	29.984	65	58	7	Overcast	29.985	70	56	14	Ditto	30.045	52	52	—	Clear & fine
F.	23	30.051	61	61	—	Clear, Fine	30.030	70	58	12	Cloudless	—.027	54	54	—	Ditto
S.	24	—.011	61	55	6	Slight haze	—.001	66	55	11	Fine	29.987	53	53	—	Ditto
S.	25	29 962	52	52	—	Densely overcast	29 925	64	54	10	Cloudy & Do.	—.906	53	53	—	Ditto
M.	26	—.888	58	50	8	Fine	—.868	71	54	17	Very Fine	—.845	58	58	—	Cloudy & fine
● T.	27	—.776	66	54	12	Hot & dry	—.718	76	42	34	Dry & sultry	—.676	58	58	—	Ditto
W.	28	— 629	56	40	16	Cloudy	—.640	63	58	5	Cloudy, fine	—.693	53	53	—	Clear
Th.	29	—.754	55	48	7	Overcast	—.764	61	50	11	Overcast	—.797	59	56	3	Cloudy, fine
F.	30	—.873	61	48	13	Fine	—891	62	53	9	Ditto	—.910	55	55	—	Ditto
		29.817	58.53	54.63	3.90		29.815	64.03	56.33	7.70		29.805	54.06	53.96	0.10	

JUNE.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	67	51	70	50	SW	Little	.03
2	66	52	70	49	——	Strong	.08
3	68	43	80	39	——	Brisk	
4	68	38	78	31	S	Ditto	.02
5	68	39	67	35	——	Ditto	.09
6	66	43	60	39	W	Little	.17
7	64	50	72	50	SW	Ditto	.23
8	65	50	72	48	——	Strong	.10
9	63	49	70	45	——	Ditto	.01
10	64	47	70	44	NW	Brisk	.34
11	64	48	66	42	W	Ditto	
12	57	48	61	47	NE	Ditto	.20
13	56	49	56	49	——	Little	.14
14	69	57	75	57	SE	Ditto	.18
15	71	48	80	42	NE	Brisk	
16	71	46	78	40	——	Ditto	
17	75	50	80	50	——	Ditto	
18	65	50	81	50	E	Little	.01
19	63	59	68	56	NE	Brisk	.01
20	63	39	65	33	——	Little	
21	73	51	78	46	SW	Ditto	
22	70	40	77	35	NE	Ditto	
23	72	49	82	44	E	Ditto	
24	66	48	73	43	NE	Ditto	
25	65	41	80	38	N	Ditto	
26	73	43	90	38	E	Ditto	
27	76	49	100	43	NE	Ditto	
28	63	40	90	33	N	Ditto	.01
29	65	48	80	42	NW	Ditto	
30	67	49	83	46	W	Ditto	
	66.57	47.13	78.40	43.46			1.62

Remarks.

During the first half of the month the weather still continued wet, and was frequently boisterous. Scarcely any rain fell after the 14th, north and easterly winds becoming prevalent. The mean temperature was 4° below the average.

The 2nd, 8th, and 9th were boisterous. On the 10th a thunder storm occurred, with heavy rain. The air was most remarkably dry on the 27th.

Mean Pressure from the 3 daily observations		29.812 inches.
—— Temperature	Ditto	58°.87
—— Dew Point	Ditto	54°.97
—— Degree of Dryness	Ditto	3°.90
—— Degree of Moisture	Ditto	.870
—— Force of Vapour	Ditto	.430 inch.
Least observed degree of Moisture		.306
Maximum Temperature in the Shade		76°.
Minimum Temperature in ditto		38°.
Maximum Temperature in the Sun		100°.
Minimum of Terrestrial Radiation		31°.
Mean Temperature of External Air		56°.85

WINDS.

North .... 2 days	N. East ..... 10 days
South .... 2 ..	S. East ...... 1 ..
East .... 3 ..	N. West ..... 2 ..
West .... 3 ..	S. West ...... 7 ..

30 days.

Amount of Rain .... 1.62 inch.

JULY.

1843.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
S.	1	29.982	64	57	7	Overcast	29.990	69	57	12		30.002	56	56	—	Clear
S.	2	—.964	62	62	—	Ditto	—.966	72	66	6	Overcast	29.995	60	60	—	Overcast
M	3	—.969	67	60	7	Fine	—.967	75	66	9	Fine	—.992	62	60	2	Ditto
☽ T.	4	—.975	62	62	—	Slight drizzle	—.919	77	68	9	Very Fine	—.836	60	60	—	Clear
W.	5	—.717	78	78	—	Sultry	—.643	85	73	12	Very sultry	—.681	64	64	—	Cloudy & Fine
Th.	6	—.751	61	61	—	Overcast	—.773	70	59	11	Cloudy & fine	—.915	58	58	—	Overcast
F.	7	—.913	62	55	7	Very Fine	—.919	69	60	9	Ditto	—.946	59	59	—	Cloudy, very fine
S.	8	—.885	62	62	—	Cloudy	—.941	62	62	—	Rain	—.876	59	59	—	Clear & Do.
S.	9	—.957	58	58	—	Foggy	—.954	69	56	3	Very Fine	—.977	59	59	—	Cloudy & do.
M.	10	—.949	62	62	—	Fine	—.935	69	53	16	Cloudy & do.	—.954	59	59	—	Ditto
○ T.	11	30.009	58	58	—	Overcast	30.064	64	64	—	Thickly overcast	30.160	56	56	—	Overcast
W.	12	—.147	63	63	—	Ditto	—.143	74	68	6	Very fine	—.085	61	61	—	Cloudy & Fine
Th.	13	—.040	68	65	3	Light haze	—.040	66	66	—	Slight rain	—.022	59	59	—	Overcast
F.	14	—.048	54	54	—	Densely overcast	—.059	73	60	13	Very fine	—.058	58	58	—	Cloudy
S.	15	—.048	63	60	3	Very Fine	—.053	78	60	18	Ditto	—.117	63	63	—	Ditto
S.	16	—.191	68	61	7	Ditto	—.227	78	61	17	Ditto	—.234	62	62	—	Ditto
M.	17	—.242	70	68	2	Ditto	—.191	79	63	16	Ditto	—.143	69	69	—	Ditto
T.	18	29.975	65	61	4	Ditto	29.887	75	65	10	Fine	29.784	55	55	—	Heavy rain
☾ W.	19	—.753	60	60	—	Cloudless	—.719	64	64	—	Dark clouds	—.709	52	52	—	Clear
Th.	20	—.756	58	54	4	Very Fine	—.741	65	65	—	Rain	—.690	56	56	—	Overcast
F.	21	—.682	62	58	4	Cloudy	—.818	67	58	9	Cloudy, fine	—.775	59	59	—	Ditto
S.	22	—.808	63	53	10	Overcast & fine	—.742	62	62	—	Rain	—.613	59	59	—	Slight rain
S.	23	—.463	58	50	8	Cloudy, squally	—.457	50	50	—	Cold rain	—.781	54	54	—	Overcast
M.	24	30.016	57	55	2	Clear	30.050	65	50	15	Cloudy & fine	30.128	48	48	—	Clear
T.	25	—.176	60	55	5	Overcast	—.192	71	60	11	Overcast & do.	—.221	54	54	—	Ditto
W.	26	—.249	66	62	4	Ditto	—.225	71	71	—	Slight rain	—.171	60	60	—	Overcast
● Th	27	—.055	61	61	—	Rain	29.995	68	68	—	Showery	29.997	59	59	—	Cloudy & Fine
F.	28	—.002	60	57	3	Fine	—.995	69	52	17	Cloudy & fine	—.955	57	57	—	Slight rain
S.	29	29.759	64	62	2	Ditto	—.681	67	67	—	Very fine	—.634	58	58	—	Cloudy & Fine
S.	30	—.636	63	59	4	Cloudy & Do.	—.643	67	60	7	Do., cloudy	—.676	55	55	—	Clear
M.	31	—.792	60	59	1	Hazy	—.866	69	60	9	Ditto	—.929	53	53	—	Ditto
		29.922	62.54	59.74	2.80		29.928	69.32	61.74	7.58		29.934	56.22	56.16	0.6	

JULY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	69	52	81	49	E	Little	
2	73	58	88	55	SW	Brisk	
3	76	59	96	58	——	Ditto	
4	78	53	101	51	S	Little	
5	88	55	115	55	SE	Ditto	.16
6	73	51	110	46	SW	Ditto	
7	68	53	91	50	——	Ditto	.14
8	62	45	70	42	SE	Ditto	.24
9	73	47	101	42	N	Ditto	.02
10	69	55	100	55	NW	Brisk	
11	62	52	68	51	N	Little	
12	77	56	109	53	NW	Ditto	
13	67	56	76	54	SW	Ditto	.07
14	76	53	95	50	NE	Ditto	
15	77	56	89	53	SW	Ditto	
16	80	58	96	56	W	Ditto	
17	81	57	95	55	——	Ditto	
18	75	49	87	47	SW	Brisk	.50
19	68	44	78	40	W	Little	.02
20	67	54	80	53	SW	Brisk	01
21	66	55	78	53	W	Ditto	
22	65	52	72	51	SW	Little	.08
23	64	40	80	36	W	Brisk	.08
24	65	42	78	38	——	Little	
25	72	47	81	44	SW	Ditto	
26	72	56	82	53	——	Ditto	.10
27	74	54	88	50	W	Ditto	.02
28	73	58	91	55	——	Ditto	.06
29	71	53	80	52	SW	Brisk	.07
30	71	49	84	47	W	Little	.07
31	69	47	81	43	SW	Ditto	.03
	71.64	52.12	87.77	49.58			1.67

Remarks.

The weather in this month was much more favourable for vegetation than it was in the two preceding months. The mean temperature was about a degree below the average; but there was abundance of sunshine, and a moderate quantity of rain. The 5th was very sultry, with a remarkably deep blue sky, and a few dusky white clouds. Rain followed this appearance, as is usually the case. Heavy rain fell on the 18th. The 23rd was squally, with cold showers.

Mean Pressure from the 3 daily observations 29.928 inches.
—— Temperature ....Ditto....... 62°.69
—— Dew Point ....Ditto....... 59°.21
—— Degree of Dryness ....Ditto....... 3°.48
—— Degree of Moisture....Ditto....... .886
—— Force of Vapour......Ditto....... .501 inch.
Least observed degree of Moisture........ .555
Maximum Temperature in the Shade ..... 88°.
Minimum Temperature in Ditto......... 40°.
Maximum Temperature in the Sun ..... 115°.
Minimum of Terrestrial Radiation ...... 36°.
Mean Temperature of External Air....... 61°.88

WINDS.

North......2 days	N. East ....1 days
South ......1 ..	S. East.....2 ..
East ....1 ..	N. West....2 ..
West ......9 ..	S. West ... 13 ..

31 days.

Amount of Rain .... 1.67 inch.

AUGUST.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
T.	1	29.934	71	55	16	Very Fine	29.908	71	55	16	Very Fine	29.849	53	53	—	Clear & Fine
☽ W.	2	—.750	62	60	2	Fine	—.678	65	65	—	Cloudy	—.621	55	55	—	Ditto
Th.	3	—.574	64	62	2	Cloudy	—.558	58	58	—	Thunder storm	—.551	57	57	—	Stormy
F.	4	—.527	61	61	—	Rain	—.537	64	64	—	Showery	—.605	54	54	—	Clear
S.	5	—.774	62	60	2	Fine	—.823	70	55	15	Very Fine	—.858	54	54	—	Ditto
S.	6	—.890	62	58	4	Light clouds	—.977	68	56	12	Ditto	30.116	53	53	—	Ditto
M.	7	30.206	62	59	3	Heavy dew	30.191	73	58	15	Ditto	—.211	62	62	—	Cloudy
T.	8	—.220	72	66	6	Overcast, fine	—.183	79	64	15	Ditto	—.153	63	63	—	Overcast
W.	9	—060	67	66	1	Very Fine	—.003	80	70	10	Very hot	29.950	64	64	—	Lightning
☉ Th.	10	29 997	59	59	—	Hazy	—.052	63	60	3	Overcast	30.177	49	49	—	Clear & Fine
F.	11	30.234	59	55	4	Very Fine	—.237	68	49	19	Very Fine	—.235	53	52	1	Ditto
S.	12	—.237	63	60	3	Ditto	—.213	72	57	15	Ditto	—.227	53	53	—	Ditto
S.	13	—.211	60	60	—	Ditto	—.200	78	62	16	Ditto	—.093	60	60	—	Overcast
M.	14	—.041	65	65	—	Hazy	—.074	79	68	11	Ditto	29.945	63	63	—	Cloudy
T.	15	29.912	66	66	—	Ditto	29.894	81	68	13	Sultry [cast	—.923	65	65	—	Thunder storm
W.	16	30.000	63	63	—	Thunder, Lightning, and Heavy rain	—.979	67	67	—	Densely over-	30.040	59	59	—	Clear & Fine
Th.	17	—097	63	63	—	Foggy	30.088	78	66	12	Sultry	—.100	63	63	—	Ditto
☾ F.	18	—.084	66	66	—	Ditto	—.016	82	75	7	Ditto	29.958	64	64	—	Ditto
S.	19	92.820	79	69	10	Very Fine	29.758	82	70	12	Cloudless	—.670	64	64	—	Ditto
S.	20	—.647	68	68	—	Cloudy	30.171	71	70	1	Overcast, fine	—.844	57	57	—	Overcast
M.	21	—.977	57	50	7	Fine, Clear	29.965	69	48	21	Cloudy & do.	—.855	54	54	—	Clear & Fine
T.	22	—.640	62	54	8	Overcast	—.552	61	61	—	Rain	—.477	54	54	—	Overcast
W.	23	—.619	60	60	—	Fine	—.590	66	66	—	Overcast	—.412	55	55	—	Heavy rain
Th.	24	—.599	57	57	—	Cloudy	—.748	69	61	8	Fine	—.787	55	55	—	Clear & fine
● F.	25	—.835	62	62	—	Fine	—.856	69	60	9	Very Fine	—.889	60	60	—	Cloudy, lightning
S.	26	—.929	63	63	—	Overcast	—.944	72	62	10	Ditto	30.068	55	55	—	Clear & Fine
S.	27	30.139	62	62	—	Foggy	30.102	66	56	10	Ditto	—.080	53	53	—	Ditto
M.	28	29.994	63	63	—	Overcast	29.939	62	62	—	Rain [cast	29.916	63	63	—	Overcast, windy
T.	29	—.964	63	63	—	Cloudy	—.986	70	60	10	Thickly over-	30.037	64	63	1	Ditto
W.	30	30 092	64	62	2	Overcast	30.110	78	68	10	Light haze	—.138	64	64	—	Ditto
Th.	31	—.195	64	64	—	Hazy	—.191	73	65	8	Very Fine	—.158	64	64	—	Clear & Fine
		29.909	63.64	61.38	2.26		29 952	71.09	62.13	8.96		29.933	58.35	58.29	0.06	

AUGUST.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	72	46	81	43	SW	Little	
2	62	52	72	50	—	Ditto	.02
3	62	54	72	51	—	Ditto	1.03
4	68	46	71	45	—	Brisk	.18
5	72	53	75	50	W	Little	.02
6	70	42	83	39	—	Ditto	
7	75	58	78	42	SW	Ditto	
8	80	58	98	56	—	Ditto	
9	82	57	99	56	S	Ditto	
10	68	44	76	40	NE	Ditto	
11	72	46	90	44	N	Ditto	
12	77	47	93	42	—	Ditto	
13	78	60	90	58	SE	Ditto	
14	79	59	90	56	E	Ditto	
15	82	60	93	54	S	Ditto	.61
16	74	55	98	54	SW	Ditto	.16
17	80	55	100	51	N	Ditto	
18	84	59	100	56	E	Ditto	
19	84	61	103	58	—	Ditto	.01
20	72	47	88	43	S	Ditto	
21	71	49	91	45	NW	Ditto	.02
22	62	45	66	42	S	Strong	.22
23	69	53	84	52	—	Little	.95
24	73	46	89	42	W	Ditto	
25	71	56	94	54	S	Ditto	
26	75	46	94	42	SW	Brisk	.01
27	75	47	94	44	NW	Little	
28	71	59	79	59	S	Ditto	.05
29	74	59	90	56	SW	Ditto	
30	77	61	94	58	—	Ditto	
31	82	56	103	53	SE	Ditto	
	73.96	52.77	88.00	49.19			3.28

Remarks.

This month was very favourable for the growth of vegetation. The mean temperature was a degree above the average. The amount of rain was upwards of an inch above the usual quantity. It fell for the most part in large quantities at a time. The 3d was boisterous and showery, with some hail in the forenoon; thunder, and heavy rain commenced at 2 P. M. and continued till upwards of an inch had fallen. Nearly as much fell on the 23d, with wind sometimes boisterous. The 4th was squally with heavy showers, and thunder in the afternoon. There was much vivid lightning on the night of the 9th. There was also thunder on the 15th, 16th, and much lightning on the night of the 25th.

Mean Pressure from the 3 daily observations 29.931 inches.
—— Temperature.........Ditto...... 64°.36
—— Dew Point...........Ditto...... 60°.60
—— Degree of Dryness....Ditto...... 3°.76
—— Degree of Moisture...Ditto...... .877
—— Force of Vapour.....Ditto...... .524 inch.
Least observed degree of Moisture...... .514
Maximum Temperature in the Shade.... 84°.
Minimum Temperature in ditto........ 42°.
Maximum Temperature in the Sun..... 103°.
Minimum of Terrestrial Radiation..... 39°.
Mean Temperature of External Air..... 63°.36

WINDS.

North	3 days	N. East.....	1 days
South	7 ..	S. East......	2 ..
East........	3 ..	N. West	2 ..
West.......	3 ..	S. West.....	10 ..

31 days.

Amount of Rain .... 3.28 inches.

SEPTEMBER.

			Morning.					Noon.					Night.				
	1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
☽	F.	1	30.282	65	65	—	Foggy	30.284	79	75	4	Sultry	29.943	67	67	—	Overcast
	S.	2	—.333	68	68	—	Slight haze	—.317	79	69	10	Ditto	30.300	64	64	—	Fine
	S.	3	—.284	65	65	—	Ditto	—.213	79	62	17	Ditto	—.200	67	67	—	Lightly Overcast
	M.	4	—.256	61	59	2	Clear	—.272	69	58	11	Fine	—.330	52	52	—	Clear & Fine
	T.	5	—.388	55	55	—	Do. heavy dew	—.370	65	55	10	Clear & Fine	—.312	53	53	—	Ditto
	W.	6	—.292	57	55	2	Clear & Fine	—.251	73	53	20	Cloudless	—.260	58	56	2	Ditto
	Th.	7	—.270	60	60	—	Slight haze	—.261	78	65	13	Do. & hot	—.246	60	60	—	Ditto
☉	F.	8	—.267	65	65	—	Ditto	—.236	75	68	7	Very Fine	— 193	64	64	—	Overcast
	S.	9	—.183	65	65	—	Ditto	—.139	75	65	10	Ditto	—.086	60	60	—	Very Fine
	S.	10	—.022	61	61	—	Foggy	—.000	70	70	—	Thunder showers	29.956	62	62	—	Cloudy
	M.	11	29.942	62	62	—	Rain	—.022	70	55	15	Very Fine	30.075	62	62	—	Overcast
	T.	12	30.200	61	61	—	Overcast	—.197	71	71	—	Overcast	—.183	58	58	—	Very Clear
	W.	13	—.133	60	60	—	Very clear	—.022	69	58	11	Fine	29.931	50	50	—	Ditto
	Th.	14	29.847	60	60	—	Hazy	29.833	67	65	2	Overcast	—.824	62	62	—	Overcast
	F.	15	—.796	68	66	2	Very fine	—.821	73	60	13	Very Fine	—.956	62	62	—	Very Fine
☾	S.	16	—.994	65	65	—	Lightly overcast	—.994	77	65	12	Ditto	30.053	61	61	—	Ditto
	S.	17	30.128	66	66	—	Slight haze	30.104	75	68	7	Ditto	—.082	58	58	—	Ditto
	M.	18	—.107	64	64	—	Fine	—.090	75	65	10	Ditto	—.148	60	60	—	Cloudy
	T.	19	—.161	65	65	—	Cloudy	—.163	75	73	2	Ditto	—.148	54	54	—	Clear & fine
	W.	20	—.107	55	55	—	Slight haze	—.064	74	60	14	Ditto	—.034	54	54	—	Ditto
	Th.	21	—.131	57	57	—	Foggy	—.155	69	66	3	Ditto	—.216	57	57	—	Fine
	F.	22	—.363	59	59	—	Clear & fine	—.406	68	58	10	Ditto	—.446	56	56	—	Ditto
●	S.	23	—.509	61	60	1	Very fine	—.508	66	62	4	Ditto	—.460	54	54	—	Ditto
	S.	24	—.467	59	59	—	Overcast	—.375	62	56	6	Overcast	—.347	54	54	—	Overcast
	M.	25	—.259	51	51	—	Ditto	—.180	64	59	5	Cloudy	—.161	50	50	—	Ditto
	T.	26	—.038	50	45	5	Clear & cool	—.064	58	44	14	Do. & Fine	29.947	42	42	—	Clear & cool
	W.	27	29.781	49	49	—	Overcast	29.714	54	40	14	Cloudy & cool	—.681	39	39	—	Ditto
	Th.	28	—.735	43	40	3	Very clear	— 757	54	44	10	Clear & do.	—.834	48	48	—	Overcast
	F.	29	—.959	45	41	4	Clear & cool	—.968	56	38	18	Cold & dry	—.937	49	45	4	Ditto
☽	S.	30	—.788	54	54	—	Rain	—.796	68	68	—	Cloudy	—.893	59	59	—	Cloudy
			30.134	59.20	58.57	0.63		30.119	69.43	60.36	9.07		30.106	56.53	56.33	0.20	

SEPTEMBER.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	85	57	104	54	S	Little	
2	82	54	100	51	N	Ditto	
3	82	57	100	53	SW	Ditto	
4	75	42	90	36	N	Ditto	
5	74	45	97	39	——	Ditto	
6	81	50	100	45	NW	Ditto	
7	83	53	101	48	S	Ditto	
8	78	62	98	58	E	Ditto	
9	79	55	99	50	——	Ditto	
10	74	56	94	53	S	Ditto	.52
11	74	58	91	55	W	Ditto	
12	75	51	91	47	NE	Ditto	
13	72	47	90	42	E	Ditto	
14	69	62	71	61	——	Ditto	.01
15	76	54	93	50	S	Ditto	
16	83	53	100	49	——	Ditto	
17	84	52	102	48	SW	Ditto	
18	80	58	101	54	NW	Ditto	.20
19	80	49	90	46	NE	Ditto	
20	81	47	100	44	SE	Ditto	
21	75	50	88	45	SW	Ditto	
22	71	48	76	43	NE	Ditto	
23	69	45	75	43	——	Ditto	
24	66	45	75	43	NW	Ditto	
25	65	41	75	34	——	Ditto	
26	66	38	72	34	——	Brisk	
27	55	32	70	27	——	Little	
28	59	34	73	27	——	Ditto	
29	62	47	77	43	——	Ditto	.24
30	68	55	75	53	W	Ditto	.01
	73.90	49.90	92.66	45.83			0.98

Remarks.

The weather throughout was exceedingly fine. The mean temperature exceeded that of any corresponding month since 1825, and was about 5° above the average. The barometer was high; and the amount of rain only ⅓ of the usual quantity for the month. On the 1st the thermometer in the shade was 85°, and on nine other days it rose to 80°, or higher. In the last week the temperature however began to decline rapidly, its mean being no less than 14° below that of the third week.

Mean Pressure from the 3 daily observations 30.120 inches.
—— Temperature .... Ditto ...... 61°.72
—— Dew Point .... Ditto ...... 58°.42
—— Degree of Dryness .... Ditto ...... 3°.30
—— Degree of Moisture .. Ditto ...... .893
—— Force of Vapour ..... Ditto ...... .487 inch.
Least observed degree of Moisture ...... .503
Maximum Temperature in the Shade .... 85°.
Minimum Temperature in ditto .... 32°.
Maximum Temperature in the Sun ...... 104°.
Minimum of Terrestrial Radiation ...... 27°.
Mean Temperature of External Air ..... 61°.90

Winds.

North...... 3 days	N. East ....4 days
South.......5 ..	S. East ....1 ..
East........4 ..	N. West....8 ..
West...... 2 ..	S. West ....3 ..

30 days.

Amount of Rain..................0.98 inch.

OCTOBER.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.999	65	65	—	Fine	29.926	69	63	6	Clear	29.992	58	58	—	Overcast
M.	2	—.999	63	63	—	Overcast	30.023	65	65	—	Showery	30.099	56	56	—	Ditto
T.	3	30.138	58	58	—	Ditto	—.109	66	61	5	Cloudy	—.061	58	58	—	Do. & mild
W.	4	—.117	60	60	—	Do. and fine	—.114	67	65	2	Do. and mild	—.091	54	54	—	Ditto
Th.	5	—.075	60	60	—	Very fine	—.024	70	58	12	Very Fine	29.895	54	54	—	Very fine
F.	6	29.736	61	61	—	Densely clouded	29.187	64	64	—	Slight rain	—.556	60	60	—	Rain
S.	7	—.568	59	59	—	Cloudy	—.592	63	63	—	Rain	—.440	59	59	—	Ditto
☉ S.	8	—.378	62	62	—	Boisterous	—.551	61	57	4	Cloudy	—.683	55	55	—	Overcast
M.	9	—.282	54	54	—	Rain	—.575	52	52	—	Rain	—.715	40	40	—	Clear
T.	10	—.916	42	42	—	Clear	—.851	58	50	8	Overcast	—.601	48	48	—	Rain
W.	11	—.217	60	60	—	Boisterous	—.137	61	61	—	Heavy Rain	—.098	51	51	—	Fine
Th.	12	—.090	47	47	—	Ditto	—.250	49	49	—	Rain	—.537	48	48	—	Clear
F.	13	—.598	39	39	—	Clear	—.753	49	35	14	Cloudy, Fine	—.661	40	40	—	Ditto
S.	14	—.740	40	40	—	Ditto	—.771	50	40	10	Ditto	—.752	37	37	—	Cloudy & cool
S.	15	—.697	34	34	—	Foggy	—.659	48	44	4	Ditto	—.649	30	30	—	Frosty and foggy
☾ M.	16	—.682	32	32	—	Frosty	—.649	45	28	17	Clear & cold	—.621	29	29	—	Clear & frosty
T.	17	—.261	43	43	—	Rain, stormy	—.250	46	46	—	Cloudy, fine	—.377	39	39	—	Stormy, rain
W.	18	—.855	39	36	3	Cloudless	—.971	46	26	20	Cloudless	30.157	31	31	—	Clear & frosty
Th.	19	30.313	30	30	—	Frosty haze	30.312	48	42	6	Ditto	—.343	30	30	—	Ditto
F.	20	—.321	30	30	—	Ditto	—.237	52	48	4	Fine	—.104	41	41	—	Cloudy
S.	21	29.869	48	48	—	Cloudy	29.933	52	52	—	Showery	—.045	37	37	—	Clear
S.	22	30.086	48	48	—	Fine	30.033	58	52	6	Cloudy & Fine	29.897	51	51	—	Stormy
● M.	23	—.014	49	49	—	Clear	—.048	53	49	4	Ditto	30.012	48	48	—	Clear
T.	24	29.868	54	52	2	Flying clouds	29.773	59	58	1	Densely clouded	29.544	53	53	—	Densely Overcast
W.	25	—.399	46	46	—	Hazy clouds	—.404	52	45	7	Cloudy	—.391	33	33	—	Clear
Th.	26	—.479	32	32	—	Frosty	—.562	49	49	—	Very Fine	—.614	34	34	—	Ditto
F.	27	—.801	32	32	—	Do. and Clear	—.529	49	49	—	Ditto	—.298	45	45	—	Boisterous, rain
S.	28	—.093	45	45	—	Boisterous	—.161	49	42	7	Boisterous	—.389	40	40	—	Clear & Fine
S.	29	—.602	39	39	—	Hazy	—.571	51	44	7	Clear	—.524	35	35	—	Foggy
☽ M.	30	—.407	49	49	—	Ditto	—.305	56	56	—	Rain	—.877	57	57	—	Cloudy
T.	31	—.394	50	50	—	Ditto	—.401	45	45	—	Heavy rain	—.902	45	45	—	Rain
		29.709	47.35	47.26	0.09		29.702	54.90	50.26	4.64		29.707	45.03	45.03	0.0	

OCTOBER.

	Temperature.				Wind.		Rain.	
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In.	Pts.
1	72	55	85	51	W	Little		.11
2	67	47	76	45	NW	Ditto		.01
3	65	54	72	51	SW	Ditto		.01
4	70	50	80	46	W	Ditto		
5	73	48	95	44	E	Ditto		
6	65	54	76	54	SW	Brisk		.19
7	69	57	84	56	——	Ditto		.06
8	62	50	71	48	W	Ditto		.22
9	54	35	60	31	——	Ditto		.11
10	64	46	69	45	SW	Little		.40
11	60	42	60	39	——	Brisk		.14
12	50	32	60	30	NW	Ditto		.09
13	53	32	65	28	W	Ditto		
14	54	29	70	24	NW	Little		
15	52	25	71	19	S	Ditto		
16	49	27	65	19	NW	Ditto		.52
17	48	36	57	32	——	Ditto		.06
18	50	24	63	20	——	Brisk		
19	52	22	66	16	W	Little		
20	57	37	62	32	SW	Brisk		.25
21	56	31	68	27	W	Little		.01
22	60	44	74	42	SW	Ditto		.11
23	61	47	76	44	——	Ditto		
24	59	45	62	44	——	Brisk		.34
25	52	28	66	23	NE	Little		
26	54	26	68	20	W	Ditto		
27	55	41	68	37	S	Ditto		.17
28	53	27	68	24	SW	Strong		
29	54	31	62	28	S	Little		.26
30	62	46	62	45	——	Ditto		.25
31	45	42	45	41	SW	Ditto		.88
	57.96	39.03	68.58	35.64			4.19	

Remarks.

This was a wet and rather cold month. The mean temperature was nearly 2° below the average, and the amount of rain upwards of 4 inches, or nearly double the usual quantity. The barometer averaged very low. Frosty nights commenced as early as the 12th; those of the 18th and 19th were unusually severe for the period of the season. On the latter night the thermometer was 10° below freezing, whilst the radiating thermometer indicated 16°. The difference between the average temperatures of this and the preceding month is usually 4; but in the present instance the difference is nearly 14°.

Mean Pressure from the 3 daily observations 29.706 inches
—— Temperature .... Ditto ...... 49°.09
—— Dew Point .... Ditto ...... 47°.51
—— Degree of Dryness ... Ditto ...... 1°.58
—— Degree of Moisture ... Ditto ...... .948
—— Force of Vapour ..... Ditto ...... .330 inch.
Least observed degree of Moisture ...... .471
Maximum Temperature in the Shade .... 73°.
Minimum Temperature in ditto .... 22°.
Maximum Temperature in the Sun ...... 95°.
Minimum of Terrestrial Radiation ...... 16°.
Mean Temperature of External Air ..... 48°.49

WINDS.

North.......0 days.	N. East......1 days.
South...... 4 ..	S. East ......0 ..
East.........1 ..	N. West.....6 ..
West........8 ..	S. West.....11 ..

31 days.

Amount of Rain................4.19 inches.

NOVEMBER.

	1843.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
	W.	1	29.709	44	44	—	Hazy	29.677	48	48	—	Hazy, damp	29.740	35	35	—	Foggy
	Th.	2	—.780	40	40	—	Foggy	—.771	48	48	—	Hazy clouds	—.713	46	46	—	Rain
	F.	3	—.652	47	47	—	Ditto	—.658	58	56	2	Very Fine	—.660	48	48	—	Fine
	S.	4	—.680	47	47	—	Slight haze	—.691	56	56	—	Ditto	—.783	41	41	—	Cloudy
	S.	5	—.938	47	47	—	Fine	—.931	54	51	3	Cloudy	—.992	43	43	—	Foggy
	M.	6	—.965	49	49	—	Overcast	—.936	51	51	—	Rain	—.927	46	46	—	Cloudy
○	T.	7	—.682	55	55	—	Heavy rain	—.662	57	57	—	Cloudy	—.749	41	41	—	Very clear
	W.	8	—.571	42	42	—	Cloudy & fine	—.500	45	45	—	Heavy rain	—.769	35	35	—	Ditto
	Th.	9	—.936	32	30	2	Clear & frosty	—.901	41	30	11	Clear	—.717	33	33	—	Clear & frosty
	F.	10	—.512	42	42	—	Rain	—.525	46	46	—	Rain	—.720	37	37	—	Cloudy
	S.	11	—.946	34	34	—	Fine	30.019	44	44	—	Easterly haze	30.112	31	31	—	Clear & frosty
	S.	12	30.167	40	40	—	Very Fine	—.136	44	38	6	Cloudy	—.144	28	28	—	Ditto
	M.	13	—.211	26	26	—	Sharp frost	—.207	39	39	—	Fine	—.227	29	29	—	Cloudy
	T.	14	—.174	35	35	—	Hazy	—.134	44	44	—	Ditto, hazy	—.124	38	38	—	Rain
☾	W.	15	—.222	30	30	—	Frosty	—.172	42	42	—	Very Fine	—.020	37	37	—	Ditto
	Th.	16	29.979	38	38	—	Clear	29.987	44	40	4	Ditto	—.007	33	33	—	Clear
	F.	17	—.914	31	31	—	Frosty haze	—.763	48	48	—	Densely clouded	29.591	46	46	—	Heavy rain
	S.	18	—.569	40	40	—	Fine	—.545	49	49	—	Fine	—.505	39	39	—	Clear & Fine
	S.	19	—.744	35	35	—	Clear	—.797	47	43	4	Clear	—.649	47	47	—	Boisterous
	M.	20	—.542	48	45	3	Ditto	—.615	49	45	4	Fine, windy	—.712	41	41	—	Clear
●	T.	21	—.600	52	52	—	Overcast	—.571	55	54	1	Overcast	—.500	53	53	—	Boisterous
	W.	22	—.536	54	54	—	Hazy clouds	—.603	53	47	6	Ditto	—.618	46	46	—	Heavy Rain
	Th	23	—.353	50	50	—	Rain	—.275	55	53	2	Cloudy	—.565	38	38	—	Clear
	F.	24	—.550	33	33	—	Foggy	—.523	43	43	—	Densely clouded	—.568	39	39	—	Rain
	S.	25	—.682	38	38	—	Hazy, drizzly	—.539	44	44	—	Hazy, rain	—.604	46	46	—	Drizzly
	S.	26	—.679	54	54	—	Cloudy	—.685	56	56	—	Cloudy	—.665	51	51	—	Cloudy, boisterous
	M.	27	—.648	54	54	—	Ditto	—.657	56	56	—	Squally	—.798	49	49	—	Clear & fine
☽	T.	28	30.075	48	45	3	Fine	30.143	53	52	1	Very Fine	30.136	51	51	—	Cloudy
	W.	29	—.293	44	40	4	Clear	—.307	50	43	7	Clear & Fine	—.366	39	39	—	Very clear
	Th	30	—.381	32	32	—	Slight frost	—.281	46	46	—	Hazy	—.064	47	47	—	Drizzly
			29.823	42.03	41.63	0.40		29.807	47.50	45.80	1.70		29.824	41.10	41.10	0.0	

NOVEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	50	32	50	28	N	Little	.02
2	49	42	50	41	NE	Ditto	.18
3	59	44	62	42	W	Ditto	
4	58	39	73	35	SE	Ditto	
5	53	37	56	38	N	Ditto	.02
6	57	44	57	43	SW	Brisk	.10
7	59	33	61	28	W	Little	.17
8	52	28	61	23	NW	Ditto	.03
9	52	26	62	22	N	Ditto	.07
10	46	30	50	25	S	Ditto	.03
11	46	26	53	21	E	Ditto	
12	48	21	57	17	——	Ditto	
13	44	25	58	20	N	Ditto	.05
14	48	26	48	23	——	Ditto	.03
15	46	35	56	30	NW	Ditto	.07
16	48	24	57	18	N	Ditto	
17	51	36	63	33	SW	Brisk	.11
18	53	29	64	25	——	Little	.01
19	52	40	60	38	——	Ditto	.10
20	51	35	55	32	W	Strong	
21	57	53	59	53	SW	Brisk	.02
22	57	44	60	40	——	Ditto	.62
23	55	28	55	23	——	Strong	.01
24	44	33	44	30	E	Little	.08
25	46	42	53	44	SE	Ditto	.34
26	56	51	56	49	SW	Brisk	.01
27	59	44	63	42	——	Strong	
28	56	41	65	35	W	Brisk	
29	56	26	58	21	——	Little	
30	52	45	50	42	SW	Ditto	.06
	52.00	35.26	57.20	32.06			2.13

Remarks.

Although scarcely the average quantity of rain fell yet the air was generally damp, as is usually the case in this month. The period of lowest temperature occurred between the 9th and 16th. The average mean temperature was fully maintained. West and south west winds were prevalent. The nights of the 19th, 21st and 26th were very boisterous.

Mean Pressure from the 3 daily observations 29.854 inches
—— Temperature..........Ditto...... 43°.54
—— Dew Point............Ditto...... 42°.84
—— Degree of Dryness......Ditto...... 0°.70
—— Degree of Moisture.....Ditto...... .975
—— Force of Vapour.......Ditto...... .278 inch.
Least observed degree of Moisture........ .661
Maximum Temperature in the Shade...... 59°.
Minimum Temperature in ditto.. .... 21°.
Maximum Temperature in the Sun........ 73°.
Minimum of Terrestrial Radiation........ 17°.
Mean Temperature of External Air....... 43°.63

WINDS.

North........6 days	N. East ......1 days
South .... 1 ..	S. East........2 ..
East ....3 ..	N. West ......2 .
West ....5 ..	S. West .....10 ..

30 days.

Amount of Rain ....2.13 inches.

DECEMBER.

		Morning.					Noon.					Night.				
1843.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
F.	1	30.034	47	47	—	Cloudy	30.038	47	45	2	Overcast	30.076	39	39	—	Clear
S.	2	—.166	31	31	—	Frosty Haze	29.991	42	37	5	Very Fine	—.215	43	43	—	Hazy
S.	3	—.348	47	47	—	Hazy	30.358	50	47	3	Cloudy & mild	—.368	45	45	—	Cloudy
M.	4	—.353	47	47	—	Do. & drizzly	—.341	49	49	—	Drizzly	—.276	45	45	—	Ditto
T.	5	—.148	48	48	—	Drizzly	—.098	53	53	—	Cloudy	—.084	50	50	—	Do. and fine
○ W.	6	—.316	40	40	—	Fine	—.335	50	48	2	Clear and fine	—.358	38	38	—	Clear & fine
Th.	7	—.278	45	45	—	Thickly overcast	—.140	51	51	—	Drizzly	—.073	50	50	—	Cloudy
F.	8	—.153	49	49	—	Very Fine	—.184	54	50	4	Clear and fine	—.212	37	37	—	Clear
S.	9	—.271	34	34	—	Foggy	—.288	41	41	—	Foggy	—.270	42	42	—	Cloudy
S.	10	—.247	44	44	—	Ditto	—.260	47	47	—	Fine	—.289	44	44	—	Hazy clouds
M.	11	—.273	40	40	—	Clear & fine	—.257	49	49	—	Very Fine	—.326	34	34	—	Fine
T.	12	—.413	32	32	—	Dense fog	—.415	36	36	—	Dense fog	—.434	34	34	—	Hazy
W.	13	—.416	32	32	—	Foggy	—.419	38	38	—	Hazy	—.427	42	42	—	Cloudy
☾ Th.	14	—.490	36	36	—	Clear & fine	—.475	48	48	—	Very Fine	—.389	43	43	—	Clear
F.	15	—.353	45	45	—	Cloudy & fine	—.342	51	51	—	Cloudy, fine	—.318	47	47	—	Cloudy
S.	16	—.333	42	42	—	Fine	—.341	53	50	3	Ditto	—.405	46	46	—	Ditto
S.	17	—.453	42	42	—	Do. slight haze	—.432	50	46	4	Clear and fine	—.427	35	35	—	Foggy
M.	18	—.451	39	39	—	Foggy	—.439	44	44	—	Foggy	—.437	42	42	—	Ditto
T.	19	—.429	42	42	—	Ditto	—.429	46	46	—	Hazy	—.422	43	43	—	Cloudy
W.	20	—.399	43	43	—	Overcast	—.356	45	45	—	Ditto	—.297	42	42	—	Ditto
● Th.	21	—.346	43	43	—	Fine	—.362	50	50	—	Overcast	—.404	45	45	—	Ditto
F.	22	—.400	43	43	—	Very fine	—.357	45	45	—	Thickly do.	—.306	48	48	—	Ditto
S.	23	—.355	51	51	—	Overcast	—.364	55	55	—	Cloudy, mild	—.358	51	51	—	Ditto
S.	24	—.416	49	49	—	Clear & fine	—.433	54	54	—	Clear and fine	—.483	49	49	—	Hazy
M.	25	—.466	49	49	—	Hazy	—.437	52	52	—	Overcast	—.396	45	45	—	Cloudy
T.	26	—.370	45	45	—	Drizzly	—.336	46	46	—	Foggy	—.346	43	43	—	Hazy
W.	27	—.412	43	43	—	Hazy	—.438	45	45	—	Hazy	—.419	42	42	—	Ditto
☽ Th.	28	—.498	44	44	—	Cloudy & fine	—.491	48	48	—	Ditto	—.476	43	43	—	Overcast
F.	29	—.454	44	44	—	Thickly overcast	—.427	45	45	—	Ditto	—.311	40	40	—	Ditto
S.	30	—.278	39	39	—	Overcast, fine	—.195	42	42	—	Overcast	—.195	40	40	—	Rain
S.	31	29.979	41	41	—	Cloudy & do.	29.879	46	46	—	Cloudy & fine	29.664	47	47	—	Do. squally
		30.331	42.45	42.45	00		30.311	47.48	46.74	0.74		30.305	43.03	43.03	00	

DECEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	48	27	49	22	N	Little	
2	48	35	52	30	SW	Ditto	.02
3	50	46	50	44	W	Ditto	.01
4	49	45	49	45	SW	Ditto	.01
5	53	38	53	35	——	Ditto	.02
6	52	36	57	31	——	Ditto	
7	55	47	55	45	——	Ditto	.01
8	58	30	66	28	W	Ditto	
9	44	34	44	33	SW	Ditto	.08
10	49	36	49	31	——	Ditto	
11	50	28	52	25	S	Ditto	
12	50	28	56	27	——	Ditto	.01
13	48	31	49	27	SE	Ditto	.01
14	51	41	57	39	SW	Ditto	
15	54	39	55	36	W	Ditto	
16	54	38	54	35	NW	Ditto	.04
17	54	30	55	28	W	Ditto	
18	45	40	47	39	——	Ditto	
19	47	42	47	38	S	Ditto	
20	49	41	49	37	——	Ditto	
21	50	42	51	41	SW	Ditto	
22	52	42	52	41	S	Ditto	
23	56	48	59	45	SW	Ditto	.01
24	55	46	56	47	——	Ditto	
25	52	35	52	33	S	Ditto	.01
26	46	41	46	41	SE	Ditto	
27	45	33	50	29	W	Ditto	.03
28	49	42	50	40	——	Ditto	
29	45	37	45	35	SW	Ditto	
30	42	39	44	37	——	Ditto	.02
31	50	30	48	29	——	Ditto	.30
	50.00	37.64	51.51	35.25			0.58

Remarks.

The prevalence of South and South-west winds had the effect of maintaining the mean temperature 4° above the average. Very little rain fell, but the air was almost constantly in a state of saturation. The barometer stood remarkably high throughout, being always above 30 inches excepting on the 2nd and last days of the month. It has not averaged so high since December 1834. The general character of the month was calm, hazy, very damp and foggy.

Mean Pressure from the 3 daily observations		30.315 inches.
—— Temperature	Ditto	44°.32
—— Dew Point	Ditto	44°.07
—— Degree of Dryness	Ditto	0°.24
—— Degree of Moisture	Ditto	.972
—— Force of Vapour	Ditto	.290 inch.
Least observed degree of Moisture		.829
Maximum Temperature in the Shade		58°.
Minimum Temperature in ditto		27°.
Maximum Temperature in the Sun		66°.
Minimum of Terrestrial Radiation		22°.
Mean Temperature of External Air		43°.82

WINDS.

North	1 days	N. East	0 days
South	6 ..	S. East	2 ..
East	0 ..	N. West	1 ..
West	7 ..	S. West	14 ..

31 days.

Amount of Rain ....0.58 inch.

Monthly Mean Pressure, Temperature, and Dew Point, &c. of 1843; deduced from the Observations recorded in the preceding Journal.

1843. Months.	Pressure. Max	Min.	Med.	Range of Barom.	Mean at Morn.	Mean at Noon.	Mean at Night.	Mean of the three Observations.	Temperature. In the Shade. Max.	Min.	Med.	Mean at Morn.	Mean at Noon.	Mean at Night.	Mean of the three Observs	In Sun's Rays. Max.	Min.	Terrestrial Radiation. Max.	Min.	Me[illegible]
Jan. .	30.502	28.181	29.755	2.321	29.779	29.771	29.750	29.766	56	19	39.67	38.38	43.58	40.06	40.67	59	40	48	13	37.[illegible]
Feb. .	30.040	28.848	29.585	1.192	29.582	29.569	29.584	29.578	54	16	36.28	34.89	40.21	33.78	36.35	61	31	44	10	35.[illegible]
March	30.330	29.341	29.862	1.039	29.865	29.862	29.859	29.862	67	18	43.20	40.90	50.00	40.77	43.91	78	39	45	12	42.[illegible]
April	30.140	29.305	29.800	0.835	29.791	29.792	29.820	29.801	70	22	47.88	48.50	55.10	44.88	49.42	80	52	49	16	50.[illegible]
May .	30.184	29.258	29.749	0.926	29.750	29.747	29.754	29.750	70	29	52.23	54.00	59.74	49.00	54.24	85	49	54	26	53.[illegible]
June.	30.160	29.223	29.810	0.937	29.817	29.815	29.805	29.812	76	38	56.85	58.53	64.03	54.06	58.87	100	56	57	31	60.[illegible]
July .	30.249	29.457	29.934	0.792	29.922	29.928	29.934	29.928	88	40	61.88	62.54	69.32	56.22	62.69	115	68	58	36	68.[illegible]
Aug.	30.237	29.412	29.935	0.825	29.909	29.952	29.933	29.931	84	42	63.36	63.64	71.09	58.35	64.36	103	71	59	39	[illegible]
Sept.	30.509	29.681	30.116	0.828	30.134	30.119	30.106	30.120	85	32	61.90	59.20	69.43	56.53	61.72	104	71	61	27	[illegible]
Oct. .	30.343	29.090	29.708	1.253	29.709	29.702	29.707	29.706	73	22	48.49	47.35	54.90	45.03	49.09	95	45	56	16	52.[illegible]
Nov. .	30.381	29.275	29.819	1.106	29.823	29.807	29.824	29.818	59	21	43.63	42.03	47.50	41.10	43.54	73	44	53	17	44.[illegible]
Dec. .	30.498	29.664	30.315	0.834	30.331	30.311	30.305	30.315	58	27	43.82	42.45	47.48	43.03	44.32	66	44	48	22	43.[illegible]
Aver.	30.301	29.227	29.865	1.074	29.867	29.864	29.865	29.865	70.0	27.16	49.92	49.37	56.03	46.87	50.76	84.91	50.80	52.66	22.08	52.[illegible]

1843. Months.	Hygrometer indicating Dew Point. Mean Dew Point at Morn.	Noon.	Night.	Mean Dew Point.	Mean Force of Vapour.	Mean degree of Dryness.	Mean degree of Moisture.	Least degree of Moisture.	Scale of the Winds. N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Days.	Rai[n] In. P[illegible]
Jan. .	38.19	42.68	40.06	40.31	.253	0.36	973	800	2	0	1	0	3	14	9	2	31	1.3[illegible]
Feb. .	34.00	38.39	33.78	35.39	.211	0.90	968	600	4	11	7	1	1	1	3	0	28	2.3[illegible]
March	39.64	43.68	40.19	41.17	.261	2.74	903	577	2	3	8	1	9	6	1	1	31	0.4[illegible]
April	46.26	46.47	44.60	45.78	.310	3.64	878	394	3	4	6	0	4	9	4	0	30	1.6[illegible]
May .	52.78	54.26	48.68	51.90	.368	2.34	919	497	0	7	6	1	5	8	4	0	31	5.[illegible]
June.	54.63	56.33	53.96	54.97	.430	3.90	870	306	2	10	3	1	2	7	3	2	30	1.6[illegible]
July .	59.74	61.74	56.16	59.21	.501	3.48	886	555	2	1	1	2	1	13	9	2	31	1.6[illegible]
Aug.	61.38	62.13	58.29	60.60	.524	3.76	877	514	3	1	3	2	7	10	3	2	31	[illegible]
Sept.	58.57	60.36	56.33	58.42	.487	3.30	893	503	3	4	4	1	5	3	2	8	30	[illegible]
Oct.	47.26	50.26	45.03	47.51	.330	1.58	994	471	0	1	1	0	4	11	8	6	31	[illegible]
Nov.	41.63	45.80	41.10	42.84	.278	0.70	975	661	6	1	3	2	1	10	5	2	30	[illegible]
Dec. .	42.45	46.74	43.03	44.07	.290	0.24	972	829	1	0	0	2	6	14	7	1	31	[illegible]
Aver.	48.04	50.73	46.77	48.51	.353	2.24	925	558	28	43	43	13	48	106	58	26	365	[illegible]

XI. *A Calendar, for four months, of the Weather, Natural History and Country Operations, at Foo-chow-foo.* — *By* G. Tradescant Lay, *Esq., Her Majesty's Acting Consul at that place.*

(Communicated by the Rt. Hon. The Earl of Aberdeen.)

For the following document the Society is indebted to Her Majesty's Secretary of State for Foreign affairs, to whom it was transmitted by His Excellency J. S. Davis, Governor of Hong Kong.

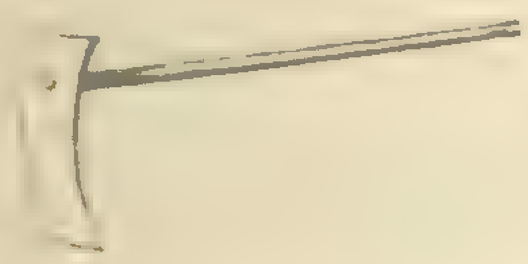
In the present state of our communications with China all facts relating to the climate and natural productions of that empire are of great interest; and most especially to the Horticultural Society, now that Mr. Fortune has been stationed in China for the purpose of collecting seeds and plants.

It is only necessary to add that the Calendars are printed exactly as they were received, with the exception of a few verbal errors of no importance.

Outlines of Calendar

Thermometer.	Barometer.	Hygrometric state.	Wind.	Sky, clouds, mists.	RAIN AND ELECTRIC PHENOMENA.
In the shade, Max. 100° Min. 80° The mercurial column attains its greatest altitude, 2 – 3 P. M., its minimum about four o'clock A. M., when it is stationary till sunrise, the ascent and descent gradual.	1st. 29.55, ascending gradually till 9th. 29.76 descending till 12th. 29.73, stationary till	Excessively dry. This dryness is not affected by a shower. Towels soddened in water are dried stiff in an hour or two.	South East. Often calm till near mid day, when a brisk and refreshing breeze springs up, rendered fitful at our residence by the heat of buildings, which seems to stop its course.	Sky in fine weather occasionally invested with a haze of a somewhat sombre hue, or sprinkled over with a few fleecy clouds or "teih ne" of the Chinese.	
The maximum occurred in the middle of the month; towards the end it was about 96°. Sensible temperature very sultry, owing to heat radiated from black roofs composed of uneven tiles. Uneven surfaces radiate more fiercely than even ones, as experiment shews.	18th. 29.65, stationary till		It is a common remark here that along the river Min, from the sea to Foo chow, the wind comes up and goes down with the tide. The channel inclines to east and west. The water of the sea is colder than the water that descends from the heated country.		17th. In the evening a thunder shower travelled from west to east over Foo-chow, that is from one high point of the hills to another. Rained hard for a short time. 20th. After mid-day the thunder was heard pealing in the distance, the lightning glared, the wind rose, and the rain began to descend, but not in copious effusion. One of the loudest and smartest claps, within my recollection, took place, apparently just over our head; it resembled a large piece of ordnance. A cool breeze followed, and the evening was pleasant.
					21st. In the evening, towards the NW., the clouds, broad and massy, seemed like a battery emitting sparks and flashes, which from time to time exploded in serpentine lines and coruscations, while a continuous blaze was spread over the face of the vapour, forming a splendid aurelia, in which these phenomena continued to play for more than half an hour.
				22nd. Haze moderated the sensible temperature and made it feel cool, though the thermom. stood at 96°.	
					24th. A shower and thunder at day-fall.
26th. Air so cool at 4 A. M. that covering on the bed was sought for; the column at 82°. 27th. On my return from a walk at sunset, found therm. at 83°, which is unusual.					27th. At 2 P. M. clouds rising from the west promise a shower. A squall follows, but of short duration, as the clouds shift rapidly.
	28th. 29.49. Stationary.				28th. About 3 P. M. sky overcast, thunder rumbling in the distance. 29th. Sky clouded; a few drops of rain patter upon the tiles.

for July, 1844.

OBSERVATIONS ON HUSBANDRY.	FRUITS, FLOWERS AND VEGETABLES IN SEASON.	ANIMAL KINGDOM.	EVENTS AND GENERAL REMARKS.
In the early part of the month the unreaped crops of rice are shorn down. The sickle is short, of small curvature and compared with that of the English, very ineffectual. It is wielded by females as well as males.	The assortment of fruit small. The plums of a rich purple and of a most grateful taste, are now in season, and cover the stalls and benches in profusion. Pines are brought hither chiefly it is said from Formosa. Pomegranates serve now to deck the table, but are of small size and little flavour.	The voice of the "Hwang pong chow," or Red-winged pie is heard among the fir-trees, and is so peculiar that it is difficult to find a similitude. It is something compounded of a sob, a howl and the dying beats of a bell. When displeased it utters a peculiar clucking mixed with the scolding of a cat.	1st. Arrive at Foo chow, take up our quarters at the office of a salt monopolist on left bank of river. 3. Meet the Superintendent of Trade.
The setting out of the second crop of rice continues till nearly the close of the month. The blades and precocious ears are cut off and thrown down by the roots.	The Jasminum Grandiflorum, or "Mo le wah," is now in its prime, cultivated in ridges for a garniture of tables.	A large forked-tailed fly-catcher, with his mate, perches on the topmost shoots of a tall tree, and from time to time soars aloft in quest of insects and then with a sweep returns back to his mate.	8. Remove to salt monopolist's residence on left bank above the bridge.
	The Vegetable most abundant now is the Convolvulus reptans, or "Oung-tsy" of the natives. It is grown not in water as at Canton, but on beds, where it yields many a snow-white blossom. It is very wholesome and relished by all. The large "Tung-kwa," or vegetable marrow is abundant and very large, sometimes a foot and a half in length and about a third in diameter. The Luffa acutangula is now in prime. These are grown over Leeks on a kind of roofing. Leeks shaded by the Gourds are plentiful, being cut three or four times a year.	A Hawk which seems to be identical with the Kestrel, utters a note which resembles that of the wry-neck, while it darts from the tall-trees to tease the fishing hawk, whose cry may always be heard, but mostly in the morning.	13. Met the Governor General.
		Dragon-flies of red, green and blue tints, skim over pools of water, or flutter along the fences. A member of the Day-fly, or Hemerobius family, with long antennæ, is seen among dragon-flies, which it much resembles in external appearance. It is new to me.	Saw fishing Cormorants on rafts for first time.
		The field spider (Tagenaira) spreads its net, an inverted cone, among the long grass everywhere.	
[illegible]th. Saw a peasant turning in the stubble with the "Louk touk," or "kah loo," a roller armed with rows of wooden teeth or pins, like the barrel of a hand-organ. Men employed in sowing "Yay Moy," or oily grain among Tobacco and other spots, in a trench opened by a hoe or mattock. 			
[illegible]men hard by employed in storing and loading salt for the interior. [illegible] that accompanies working of the [illegible]. 			

Outlines of Calendar

Day of month.	Therm.	Barom.	Hygrometric state.	Wind.	SKY, CLOUDS, MISTS, RAIN AND ELECTRIC PHENOMENA.
1	max. 91°	29.49	Very dry	S. East	Cumuli or fleecy clouds, with mists, which are clouds couching over the city.
2	.. 91	—.43		..	
3	.. 93	—.43		..	
4	.. 93	—.56		..	Rain fell in the night.
5	.. 93	—.66	Less dry	..	Nimbose clouds.
6	.. 85	—.60	..	..	Showery in the afternoon.
7	.. 92	—.60	Very dry	..	Cloudy.
8	.. 92	—.60		..	Morning bright.
9	.. 92	—.68		..	In the morning, rainbow over the city; day showery.
10*	.. 89 * Min. observed this night, 83°.	—.56		Morning, S. East. Evening, N. East.	Morning bright; afternoon cloudy. In an evening walk noticed large massive clouds, brooding over the valley, on this side the southern range of hills. On a sudden the wind, then southerly, veered to the north, and huge volumes of sable coloured vapour made their appearance over the city. A stagnation ensued, which lasted a few minutes, as if the atmospheric columns were vibrating between a double and opposite course; a shower followed, but did not last long. In the night the rain fell in torrents and the wind blew tempestuously. The air was chill, but had not a portable thermometer to ascertain the temperature, which I regret.
11	6 A. M. 82 10 .. 82 2½ P. M. 80 4 .. 80	—.36 —.38 —.38 —.43 Fall in Barom. followed the gale.	No apparent change in dryness.	North	Sky, at sunrise, hazy and nimbose, black clouds skirting the hills behind the city. Wind strong and gusty. At 8 o'clock, A. M., rain had ceased. 10 A. M., rain, with a mist over the city. P. M., rain, with blinks and gleams of sunshine. Air cold to sense; wind hushed. Thunder and lightning in the night; chilly.
12	7 A. M. 80 3½ P. M. 89	—.61 —.67			Haze; detached fragments and sheets of cloud invest the sky. The largest and most sombre masses overhang the city, the focus and centre, around which atmospheric charges seem to play.
13	Sunrise 82 P. M. 90	—.67			Morning, gray dew on the grass. Calm and massy clouds in the evening. Much foam floating down the river.
14	Sunrise 82½	—.74			
15	Not at	home.			
16	Morn. 94	—.69	Very dry		Clouds threaten rain, being of a nimbose character.
17	94	—.73			Sultry in the morning, succeeded by a haze; clear at noon.
18	92	—.69			
19	92	—.66			Day fine and sultry.
20	94	—.62			P. M., a shower. Clouds red at sunset; evening fine.
21	A. M. 89 3 P. M. 85	—.56 —.51	Draught of the air scalds the face.		Morning gray and sultry. At noon a shower, during which the barometer and thermometer both fell, which is unusual, as showers are so local, that they affect not these columns, in general, at this place. Evening showery.
22	A. M. 89	—.45		N. East	Day ushered in by a drizzling shower; afterwards intermitting between sunshine and a nimbose haze. Evening showery.
23	A. M. 82 Stationary	—.41 fell $\frac{3}{100}$		S., gusty	Much rain had fallen in the night. Day throughout rainy.
24	A. M. 81	—.65		Calm At sunset N. East.	Had rained steadily in a calm night. The nimbose sheet parting a little in the south, sun burst through between seven and eight. Afternoon fine; heavy shower at sunset, and shift of wind
25	Sunrise 82 P. M. 88	—.72		S. East	Fine, breeze refreshing.
26	Sunrise 82 Noon 90	—.72		S. East	Morning fine; breeze fresh; shower in the evening.
27	Noon 87	Stationary		S. East	Morning showery. Rainbows, primary and secondary, bestriding the city. A supernumerary arch green.
28	P. M. 89				Morning hazy; day hot and clear.
29	Not at	home.			
30	P. M. 90				
31	P. M. 90				

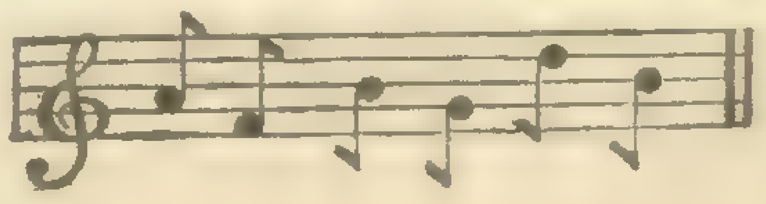
for August, 1844.

OBSERVATIONS OF HUSBANDRY AND GARDENING.	FRUITS AND FLOWERS IN SEASON.	ANIMAL KINGDOM.	EVENTS AND GENERAL REMARKS.
Peasants employed about the Rice crop; the women on hoeing, the men in replanting where it has failed, thinning where the tufts are too dense, in stirring the soil around the root, and wrapping it up in decayed straw: the last is very laborious, as the workman kneels the while in the mud and water. The water-wheel, for irrigation, complains of an ungreased axle, in sounds that fill every corner of the valley.			
			During the storm, a house, ignited by the falling down of a lantern, spread the flames till thirty shared the same fate. The buildings being of wood, no small effort on the part of the military, who comprise a Fire Brigade, to extinguish the flames, was required. Fires are infrequent; a remarkable fact, as the houses are chiefly timber, the air dry, and the people crowded.
		A black silky Ant, with its thorax armed with spines, and the free midriff joint, with three prongs, like a Chinese halberd, is seen coursing over the shrubs and bushes in search of glandular juices or the cutaneous excretion of the Coccus. Its nest, made of paper, compounded of mashed fibre, saliva and leaves and sticks, hangs on trees and fences.	
Tobacco cut, and dried by interlacing the leaves in hurdles to keep them flat. The stump of the plant is left to throw out a few shoots.			Visited the highest hill within the bason-like valley of Foo-chow, and observed that the rock is porphyritic, chiefly of felspar, which, disintegrating, crumbles into a fine red clay.
The oily grain in flower. It needs the hoe but little, as few weeds venture to spring up near it. The Sugar-cane in full luxuriance.	Longans, much esteemed and plentiful, now begin to shew themselves at table. Plums continue, but disappear towards the close of the month.		The "Gazelle," sent by Capt. Gribble, to enquire for our welfare arrives. She had experienced very heavy weather, and witnessed great fluctuations in the barometer during the gale.
The gourds and melons mentioned in the foregoing month, continue with the Momordica charantia.	A small green fruit, which the natives call Yew kang, is seen on stalls, (from Amoy). The Indian Shot, very common here, is now in flower, as is also a species of Mirabilis. Pears may be seen upon the trees in here and there an enclosure, but they are small, hard and tasteless. A large kind serves to adorn the greengrocer's board, which, it is said, are from the South, but they are scarcely to be eaten by a foreigner. Towards the end of the month Guavas are gathered green and ripen on the benches.	The white Crane, very common, with several of a veined plumage. The former amuses itself by catching the flies, which settle upon Cows while at pasture.	"Gazelle" starts. The Chinese spinsters pray "New Lang" to bestow on them ingenuity, and in order to know whether the divinity listens to their vows, each strives to thread a needle behind her head. If she chance to hit the eye of the needle, her parents and friends congratulate her; if she misses, they think the opening talents of the young maid will fall short of their wishes. In Se-chuen young ladies put a spider into a box and hold it while they recite a prayer to New Lang. If the spider has in the meantime begun to spin a web, they deem it a good omen. Music and processions at night. The "Petrel," belonging to Messrs. Dent and Co., anchors at the Lo Sing Pagoda. Mr. Braine arrives at Foo-chow, with a view of making enquiries as to the prospects of trade.

Outlines of Calendar

Day of month.	Therm. Min.	Therm. Max.	Barom.	Hygrometric state.	Wind.	SKY, CLOUDS, RAIN, MISTS, AND ELECTRIC PHENOMENA.
1	82	90	29.72	Dry	N. East	Morning and day clear
2	82	90	—.72	..	..	Morning clear, in the evening clouds rose in the North and followed each other in quick succession. Wind at that time easterly. A gentleman remarked that it was going to blow from the South again.
3	83	89	—.63	..	..	A fresh breeze has been blowing all night from the South, which accounts for the Therm. being at sunrise 2 degrees above its usual average, 82. The sky bore a nimbose aspect all day. Wind gusty in the Evening. The night cloudy, but not so as to obscure the moon.
4	86	88	—.60	..	A calm S. East	Sun breaking from between the clouds in the Morning. In the Afternoon, heavy rain with thunder and lightning.
5	84	88	—.66	..	S. East	Morn, clouds dispersing and the sun shining. In the Afternoon, a shower, evening, fine.
6	84	88	—.68	..	..	Morn, fine, at first clouded agreeably, as clouds by their interposition screen the earth.
7	80	81	—.70	..	Newly calm S. East	Day cloudy. Is the unusual coolness of this day owing to the clouds? Night cool, sky overcast with dark motionless clouds.
8	78	Not obsvd.	—.74	..	S. East	Day cloudy. This fall in the Therm. and rise in the Barom. betokens a Northerly wind. Moisture fell in the night.
9	—	80	—.78	..	..	Day throughout with sky overcast, but no rain fell.
10	Not	at	home.	..	N. East	Rainy and cold on the ridge of the hills.
11	—	78	—.78	..	N. and NE.	No rain at Foo-chow. Sky cloudy. The clouds of the cold-region wind, that is, strato-cumuli loose above, even below, menace rain without falling into a rain cloud.
12	74	—	—.78	..	N. East	Sky overcast. The foam and color of the water indicate that rain has fallen up the bason of the river Min, i. e. on the hills to the westward.
13	Not	at	home.	..	..	Rain, clouds, and piping winds at the Monastery.
14	—	80	—.78	..	..	Day, a mixture of fine and cloudy.
15	75	—	—.78	..	..	Morn overcast. Breeze fresh and cool.
16	—	86	—.76	..	S. East	Morn, sky covered with hard-seeming clouds, clear as the day sprang up.
17 to 20	—	83	—.76	..	N. East	Sky clear with occasional variations of that dark-stoned and apparently solid mantle, which is peculiar to the N. wind in northern latitudes, as it is to the S. in southern latitudes.
21	—	82	—.78	..	..	Morn, light rain accompanied a cloudy dawn, or, the cloud was so low as to couch upon the surface of the earth. Day hot and misty.
22	Not	obser	ved.	..	..	Day very hot and misty.
23	—	89	—.78	..	..	Day, very hot and sultry.
24 to 27	—	88	—.78	..	..	Weather fine and cheerly. The North-East Monsoon fairly set in.
28	84	88	—.79	..	..	Day, fine and sultry.
29	84	88	—.79	..	..	Day, fine and sultry.
30	80	84	—.79			Day fine.

for September, 1844.

OBSERVATIONS OF HUSBANDRY AND GARDENING.	FRUITS AND FLOWERS IN SEASON.	ANIMAL KINGDOM.	EVENTS AND GENERAL REMARKS.
In this month the beds of the Convolvulus reptans, or Oung-tsy of this place are cleared and the soil turned up for planting the "pak tsae," or Chinese Turnip. These are first sown and then transplanted, as are all vegetables belonging to the Cruciferous family.	The Longans are gathered in this month and are met with in profusion every where. The zeal and joy that accompanied the plucking of this fruit remind one of greater things; the Autumn at home; and, the Grape gatherings in the East. A fortnight, or three weeks before they are plucked, lodges are built to guard them from thieves, props are placed under their boughs and their trunks surrounded with a ruff of thorns.	Magpies moult in the early part of this month and are consequently seen moping in silence, or uttering a plaint or two as if heart-sick. In about a fortnight they overcome their indisposition, gain a new suit of feathers and hold their noisy levees on the sides of the hills with great spirit and fire.	I am told that there is a current of old Spanish Dollars running from Chinchew or Cheun-chow at the rate of 1½ lac per month; some hoards must have been ransacked to supply this stream. Mr. Braine starts for the Pagoda, to join the "Petrel."
The stakes and roofings as substitutes for trellis work which supported the different kinds of gourds and melons are cleared away and the Leeks, which they shaded, begin to lose their freshness and beauty.	The Guavas are gathered generally before they are ripe, for the sake of economy. When taken from the tree with a nice attention to their color and form, they prove very acceptable, but if bought from the stall they are little esteemed.	The calls of the Shrike or Butcher bird are heard occasionally. Soon after Sunrise he indulges the feathered tribes with a song, but he is so shy of letting his powers be known that I am not aware any Naturalist, except the writer, ever noticed it.	The fleet of Junks, from Ningpo and other places on the Coast, begins to diminish, as the Shipmen are wishful to save some of the Monsoon.
The fields of rice that formed such an object of solicitude in the preceding months, are now comparatively quiet, rejoicing in one continuity of the richest green. Still the farmers are not asleep, men and women are seen in the fields searching for weeds that may spring up unawares.			Started a fine hare amongst the fir-trees. Visit the Monastery of Koo-shan seated in a romantic spot.
The hoeing of sweet potatoes and the training of their stems form a part of the husbandman's business now. To water the roots and stir the earth has an obvious tendency to nurse the tubers, while the care bestowed on the tops is with a reference to their usefulness in affording provender for pigs. The Eleocharis tuberosa blossoms in this month. Its jointed rushlike stem makes it appear unique amongst plantations of rice. White awned and red awned rice in flower, these are planted later than the first crop of rice, and are later in coming to the sickle. They are called "sook" by the natives; the latter crop just beginning to open. This is called "wang ching me;" or, otherwise, "tew," the Fochow pronunciation of the Mandarin "taou." Job's tears, grown here for the sake of the Involucres, or enamelled sheath of the flower, fringe some of the rice plots very charmingly, as it is at once in fruit and flower. The leaves are softly turned and luxuriant; the clusters or panicles nodding their graceful forms. These beads of nature's own turning are in request for rosaries.	Various kinds of Toad-stools are gathered among the Fir-trees by the peasantry, their color is yellow, with a mixture of red. They are dried before they are fit to eat. Leeks are very abundant. The pik-tsae is fit for the table, as is also the sweet potatoe. The po-tsy, or Spinach appears. The Brinjal is grown here, but is not remarkable for size or goodness.	The white Herons assemble and wheel round as if mustering their numbers for an aery jaunt, though it is not apparent that all leave for Southern regions. The fishing hawks assemble at day-fall and wheel round in a kind of social pastime, or a trial of their powers, as they soar to a great elevation. Swallows begin to meditate a migratory journey. In this month, the Cicadæ, seated upon the Fir-trees make the groves and copses resound. As the old ones die, younger ones emerging from their humble condition in holes of the ground, leave their last garments behind and after a few hours climb to the tops of the trees. Song of the Throstle, "Osheput" of Canton, and "Ching chow" of this place is heard at day-spring. The notes are mellow and heart-cheering. They may be set down in diatonic scale thus. Song of the Chinese Throstle. 	(20) Public examination in the Four Books takes place to day. The Candidates assemble to write essays at night. Other classics on each alternate day till the 29th. Emperor's birth-day; but little stir about it in vicinity. "Proserpine" Steamer arrives. "Proserpine" leaves to take her station at the mouth of the Min, to await the arrival of the "Castor" with His Excellency the Chief Superintendent.

Outlines of Calendar

Day of month.	Therm. Min.	Therm. Max.	Barom.	Hygrometric state.	Wind.	SKY, CLOUDS, MISTS, RAIN AND ELECTRIC PHENOMENA.
1	—	77	29.85	Dry	N. East	Cloudy with light showers.
2 and 3	Not	at	home.	..	..	Weather fine; wind strong, which at times brought clouds from the North.
4	—	84	—.85	..	..	Day fine.
5 6 7	Not	at	home.	..	..	Weather bright and fair at the entrance of the River, where the Proserpine is lying.
8	—	86	—.60	..	..	Sky overcast during the day.
9	Not	at	home.	..	..	
10	—	80	—.93	Very dry	..	City enveloped in mist all day.
11	Not	taken		..	..	
12	Not	taken.		..	..	Sky overcast at various times during the day.
13	Not	taken.		Dry	..	
14	—	81	—.87	..	..	Day cloudy.
15	—	81	—.87	..	..	Ditto.
16	—	81	—.83	..	..	Ditto.
17	—	80	—.83	Very dry	..	The sky clearer to-day. The surrounding hills seem to cause that prevalence of haze so common [illegible] in this month.
18	—	80	—.81	..	..	Sky during the day, alternating between fine and cloudy.
19	—	84	—.79	..	..	Day fine.
20	—	82	—.83	..	Noon, NE. and E.	Dark clouds with their edges colored red, usher in the sunrise. Sky clear and cool throughout the [illegible] Strong southerly breezes at noon.
21	—	78	—.83	..	N. East	
22	(Sunrise), 71	76	—.83	..	..	4. AM. Showery. The weather feels cold to sense. Cloudy.
23	—	82	—.82	..	..	Dew on the grass. Day fine, clear, and warm.
24	—	82	—.84	..	..	Dew on the grass at sunrise. Midday fine. PM. Sky overcast with a cloud that reached to the [illegible] Night clear and cold. Wind rising: the couching vapour merely the forerunner of a [illegible] breeze.
25	64	72	—.87	..	..	Day cloudy; evening sombre, followed by a cloudy night.
26	—	72	—.87	Less dry	..	Day fine; cloudy at night; about midnight, rain.
27	70	71	—.87	..	..	Air less chilly in the morning: night very mild, fine.
28	—	82	—.84	..	..	Day fine; mist over the City. Evening, clouds threatened rain, but it was only the precursor [illegible]
29	—	83	—.82	..	..	A fog in the morning. Fine and sultry, mid-day. Showery at day-fall.
30	72	72	—.95	..	..	Day cold and overcast. Mist heavy and cheerless over the City.
31	72	80			S. East	A sense of warmth in the atmosphere and the previous night was mild. Noon and afternoon [illegible] cheerly.

for October, 1844.

OBSERVATIONS OF HUSBANDRY AND GARDENING.

The fields that in the preceding month displayed such a fine mantle of green, are now beginning to wear a yellow [illegible]. The echoing water-wheel is [illegible], and the husbandman's cares are directed to the kitchen garden.

The seeds of Spinach, Celery, Pih-tsae, or White Turnip, and other culinary vegetables, are sown in separate beds, to be transplanted as soon as they have acquired about two inches in length.

[illegible] of Onions exhibit great luxuriance; celery has acquired a few inches in length, and garlicks are seen sprouting through the straw that covers their bed.

The sweet potatoes cut into small shavings, are spread over the area of [illegible] to dry in the sun, and preserved as a winter stock. In this form they are grateful to taste and convenient for a voyage, as sea-store.

Setting out Mustard-Plants, or Ky-tsy, in holes filled with ashes. This pot herb is distinguished for its broad leaf veined with red.

Planting garlick in holes. A segment of the root is put into each hole. The bed is forthwith covered with straw.

[illegible] up the Leeks, or Kew-tsy and tearing away a part of the root. Thus treated, the plants are set again.

After this operation the beds soon exhibit a very elegant appearance, for the plants almost instantaneously assume the freshest green, while the [illegible] are ornamented with prism-like [illegible] of soil planted with the White Cabbage, or Pih-tsae, Spinach, or Mustard. To increase the effect, the bed is often fringed with lettuce [illegible].

[illegible] is with the Gardener sufficiently pliant and diversified, so that while beauty and economy are aimed at, [illegible] is left for taste and [illegible] wants.

FRUITS AND FLOWERS IN SEASON.

The "Diospyros kaki," a tree belonging to the Ebony family, furnishes now its well-tasted and sightly fruit for the dessert, and the lighter meals of the better sort of Chinese. It is called by the natives, Te. Kaki is the Japanese term for it.

Oranges in a green state begin to make their appearance at table; but the trees do not thrive much in the neighbourhood, as the bark is apt to crack and secrete a gummy exudation.

The Pumeloes are ripe but small, unenticing and not well flavoured. They are called "Paw" here: the rind of the stunted sort, is made into boxes.

The sweet potatoe is now in great abundance. It has two varieties; the pale, and red: the latter is preferred. Both are pleasant, highly nutritious and easily digestible. They are steamed and sold to workmen and passengers, at an early hour.

Onions are now plentiful and of easy purchase. The bulbs are small, and, not being intended for a winter stock, no pains are taken to make them ample. The supply of fresh Onions lasts through the winter; crop succeeding crop, till the spring.

The Jasmine still continues to flower, but the leaves lose their freshness; and the flowers, some of their scent.

The Chrysanthemum is seen in pots, but seldom in flower-beds, since the non-residence of the gentry checks the love of display.

The Pyrethrum Indicum, or Gney-tsy of the natives, is now fit for cutting, when the leaves appear in tufts and the stems not yet developed.

A cabbage called "Ky-lan-tsy," with blue bloom and lyrate leaf, is fit for table. It has little of the cabbage flavour when dressed.

ANIMAL KINGDOM.

The yellow-headed Starling, or "King-chow," with its gay piebald plumage, now perches on trees hard by dwellings, and cheers them with its song.

Pied or yellow-headed Starling's Song.

Spiders of the Clubiona and Attus kind, now retire to the habitations which they form by drawing two leaves together and lining them with a dense web. When the tree is of a deciduous kind, they anticipate the fall of the leaf by binding its footstalk to the stem.

About the middle of the month the Wagtail arrives, and utters its wintry note by the side of the pool or river, on the roofs of buildings and objects in the neighbourhood of man.

Butterflies distinguished for their size and beauty (papilio), are now less frequent, and the various pretty moths which spring from the grass at every step have retired to their hiding places, except such as belong to the silk worm kind, which sleep on the surface of leaves during the day and enjoy their pastime at night. A dark colored Sesia may be seen in copulation on stems of grass and the stalks of plants.

That curious sort of Sand-wasp (Ammophilus) is seen occasionally asleep, hanging merely by its jaw. The adductor muscles of the mandibles are short, and draw them towards each other independently of the will of the insect.

The White Tippet Crow, noisy, at all times, is now unusually vociferous.

To native dames the Magpie is always welcome, because he laughs; the Crow otherwise, because he reiterates I want, I want, (*Caw, Caw*).

EVENTS AND GENERAL REMARKS.

An officer arrives from the Proserpine, to report an assault made by the Natives near the mouth of the River (Woo ko mun how, upon some officers belonging to the Steamer, at 2 PM.

At 2 AM. start for the Steamer in company with deputies from the Authorities to enquire into the causes of this assault. Met the Am. Schooner "Petrel," and obtained a pilot for her at the Station.

Return to Foo-chow.

Start for the "Proserpine" in company with a Deputy from the Fan-tae, and return to Foo-chow on the evening of the 7th.

His Excellency arrives at Foo-chow.

Takes a view of the City from the Pagoda in the morning. In the afternoon receives a visit from the Chinese Authorities.

Starts in the Proserpine.

XII. *Notes made in the Garden of the Horticultural Society upon the rate of growth by plants at different periods of the day.* Second Series. — *By* John Lindley, *Ph. D., F. R. S.*

In a previous part of this Volume has been given a detailed account of certain observations upon the growth of plants, and of the inferences which appeared to be deducible from them. Those observations were however made upon plants placed in the atmosphere of a stove, and therefore it appeared desirable to institute a similar enquiry into the rate of growth in the open air, under the ordinary conditions to which vegetation is exposed in this climate.

For this purpose one specimen of each of the following species, viz., the Hop, Vine, Sweet Willow, Scarlet Running Kidney Bean, Fig, Jerusalem Artichoke, and Gourd, was planted in front of a vinery in a sheltered situation favourable for their quiet growth, and their increase in length was noted three times daily. The periods for the observations were fixed at 4 o'clock in the morning so as to ascertain the growth during darkness, at noon so as to obtain the growth in the cooler part of the day, and at 8 P. M., up to which period the plants would have been exposed to the influence of the hottest and driest part of the 24 hours.

The duty of watching the experiments was intrusted to Mr. Joseph Holmes who examined the plants most carefully for two months, during which time 1011 observations were collected. It has not however appeared necessary to print at length the August observations, because they convey no information beyond what is furnished by the July experiments, as detailed in the following tables.

Observations on the growth of the Hop, taken at 4 A. M. (Night), 12 Noon (Morning), and 8 P. M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M.	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8 P. M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.95	..	Overcast
3	1.33	56½	Cloudy	.95	59	Cloudy, little wind	.26	60	Ditto, calm
4	.49	56½	Rainy	.91	61	Ditto, brisk wind	1.13	63½	Cloudy
5	.63	59½	Overcast	.85	62½	Ditto, little wind	3.32	62	Ditto
6	.95	55	Cloudy	.55	60	Ditto, calm	1.04	63½	Ditto, mild
7	.78	59	Overcast, mild	.90	62½	Overcast, calm	3.94	63	Rain
8	.70	57	Ditto	.95	62½	Clear at intervals	2.08	66½	Clear, fine, calm
9	1.35	61½	Cloudy, calm	3.08	65	Very fine sun, little wind	2.52	67½	Ditto, ditto, mild
10	.63	60½	Clear, fine, (dew)	.70	58	Ditto and light clouds	2.18	67½	Cloudy, mild
11	3.15	63	Clear, mild	1.55	66	Ditto	1.85	67½	Ditto
12	.92	60½	Cloudy	.94	60	Showery, brisk wind	2.80	60½	Cloudy, showery
13	1 35	57	Ditto	1.00	60½	Ditto	1.37	62½	Rain
14	1.20	60	Clear, brisk wind	1.15	61½	Clear, brisk wind	3.30	61	Clear and fine
15	1.28	57	Clear, very fine	1.44	62½	Clear and dry, little wind	1.83	65	Ditto
16	.44	55	Slightly overcast	.83	56	Overcast, little wind	1.78	61	Ditto
17	.77	54	Clear	1.64	60½	Slight haze, little wind	1.43	65	Cloudy, fine
18	.59	56	Cloudy, calm	2 04	62	Very fine, little wind	2.97	62	Clear
19	.80	52	Ditto	1.22	65½	Fine, thunder shower	1.14	60	Cloudy, mild
20	.63	52½	Clear	.78	59	Clear and hot, little wind	1.80	64½	Clear, calm
21	.73	54½	Ditto, calm	.66	61½	Ditto	1.96	64½	Ditto
22	2.80	55	Ditto	2.26	66	Bright sun, sultry	2.21	72	Bright sun, sultry
23	2.75	62½	Ditto	2.97	70½	Ditto	2.70	75½	Clear, fine, sultry
24	2.14	65½	Very fine, mild	1.51	71½	Hot, sultry, slight haze	2.85	74½	Clear, calm
25	.98	62	Foggy, mild	1.68	69	Ditto	2.52	76½	Cloudy, mild
26	3.63	66½	Cloudy, calm	1.55	66½	Cloudy, little wind	1.23	66	Clear, fine
27	2.40	59½	Cloudy	1.30	65½	Clear, very fine, dry	3.55	67½	Ditto
28	3.30	59½	Clear, calm	3.38	67½	Fine, little wind	1.36	67	Cloudy, mild
29	2.85	58½	Cloudy, slight rain	1.39	63	Hot and dry, brisk wind	1.72	63	Clear, fine
30	1.75	56	Cloudy	.88	58½	Overcast, brisk wind	1.07	61	Showery, cold
31	.70	57½	Cloudy, cold wind	1.06	61½	Cloudy, brisk wind	1.55	60½	Fine, brisk wind
	42.02 Total.	54.81 Average.		40.12 Total.	62.62 Average.		60.41 Total.	65.17 Average.	

Greatest night growth on the 26th.
Least .. .. 16th.

Greatest morning growth on the 28th.
Least .. .. .. 6th.

Greatest afternoon growth on the 7th.
Least .. .. .. 3rd.

Average night growth	1.44
——— morning growth	1.38
——— afternoon growth	2.01

Observations on the growth of the Vine,* taken at 4 A. M. (Night), 12 Noon (Morning), and 8 P. M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M.	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8. P. M.
Jul	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.13	..	Overcast
3	.09	56½	Cloudy	.05	59	Cloudy, little wind	.06	60	Ditto, calm
4	.04	56½	Rainy	.09	61	Ditto, brisk wind	.03	63½	Cloudy
5	.06	59½	Overcast	.06	62½	Ditto, little wind	.04	62	Ditto
6	.07	55	Cloudy	.09	60	Ditto, calm	.04	63½	Ditto, mild
7	.09	59	Overcast, mild	.07	62½	Overcast, calm	.08	63	Rain
8	.08	57	Ditto	.05	62½	Clear at intervals	.08	66½	Clear, fine, calm
9	.06	61½	Cloudy, calm	.07	65	Very fine sun, little wind	.08	67½	Ditto, ditto, mild
10	.09	60½	Clear, fine, (dew)	.05	58	Ditto and light clouds	.03	67½	Cloudy, mild
11	.08	63	Clear, mild	.06	66	Ditto	.07	67½	Ditto
12	.10	60½	Cloudy	.09	60	Showery, brisk wind	.08	60½	Cloudy, showery
13	.10	57	Ditto	.08	60½	Ditto	.05	62½	Rain
14	.11	60	Clear, brisk wind	.08	61½	Clear, brisk wind	.04	61	Clear and fine
15	.12	57	Clear, very fine	.04	62½	Clear and dry, little wind	.03	65	Ditto
16	.08	55	Slightly overcast	.07	56	Overcast, little wind	.06	61	Ditto
17	.07	54	Clear	.04	60½	Slight haze, little wind	.03	65	Cloudy, fine
18	.02	56	Cloudy, calm	.04	62	Very fine, little wind	.04	62	Clear
19	.04	52	Ditto	.04	65½	Fine, thunder shower	.02	60	Cloudy, mild
20	.09	52½	Clear	.04	59	Clear and hot, little wind	.03	64½	Clear, calm
21	.02	54½	Ditto, calm	.03	61½	Ditto	.04	64½	Ditto
22	.04	55	Ditto	.09	66	Bright sun, sultry	.07	72	Bright sun, sultry
23	.07	62½	Ditto	.09	70½	Ditto	.10	75½	Clear, fine, sultry
24	.08	65½	Very fine, mild	.07	71½	Hot, sultry, slight haze	.11	74½	Clear, calm
25	.13	62	Foggy, mild	.11	69	Ditto	.16	76½	Cloudy, mild
26	.16	66½	Cloudy, calm	.18	66½	Cloudy, little wind	.10	66	Clear, fine
27	.11	59½	Cloudy	.07	65½	Clear, very fine, dry	.20	67½	Ditto
28	.13	59½	Clear, calm	.08	67½	Fine, little wind	.20	67	Cloudy, mild
29	.11	58½	Cloudy, slight rain	.11	63	Hot and dry, brisk wind	.09	63	Clear, fine
30	.08	56	Cloudy	.05	58½	Overcast, brisk wind	.04	61	Showery, cold
31	.02	57½	Cloudy, cold wind	.05	61½	Cloudy, brisk wind	.03	60½	Fine, brisk wind
	2 34 Total.	54.81 Average.		2.04 Total.	62.62 Average.		2.16 Total.	65.17 Average.	

Greatest night growth on the 26th.
Least 18th, 21st and 31st.

Greatest morning growth on the 26th.
Least .. .. 21st.

Greatest afternoon growth on the 27th, 28th.
Least .. .. .. 19th.

Average night growth	.08
——— morning growth	.07
——— afternoon growth	.07

* Like the Fig, too recently planted, dry weather setting in.

Observations on the growth of the Sweet Willow, taken at 4 A. M. (Night), 12 Noon (Morning), and 8 P. M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8 P. M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.17	..	Overcast
3	.11	56½	Cloudy	.16	59	Cloudy, little wind	.20	60	Ditto, calm
4	.17	56½	Rainy	.24	61	Ditto, brisk wind	.07	63½	Cloudy
5	.15	59½	Overcast	.10	62½	Ditto, little wind	.16	62	Ditto
6	.14	55	Cloudy	.14	60	Ditto, calm	.15	63½	Ditto, mild
7	.13	59	Overcast, mild	.16	62½	Overcast, calm	.19	63	Rain
8	.14	57	Ditto	.24	62½	Clear at intervals	.24	66½	Clear, fine, calm
9	.13	61½	Cloudy, calm	.17	65	Very fine sun, little wind	.25	67½	Ditto, ditto, mild
10	.16	60½	Clear, fine, (dew)	.21	58	Ditto and light clouds	.17	67½	Cloudy, mild
11	.16	63	Clear, mild	.28	66	Ditto	.41	67½	Ditto
12	.17	60½	Cloudy	.12	60	Showery, brisk wind	.17	60½	Cloudy, showery
13	.12	57	Ditto	.33	60½	Ditto	.15	62½	Rain
14	.13	60	Clear, brisk wind	.13	61½	Clear, brisk wind	.11	61	Clear and fine
15	.11	57	Clear, very fine	.12	62½	Clear and dry, little wind	.35	65	Ditto
16	.18	55	Slightly overcast	.18	56	Overcast, little wind	.14	61	Ditto
17	.13	54	Clear	.12	60½	Slight haze, little wind	.12	65	Cloudy, fine
18	.10	56	Cloudy, calm	.11	62	Very fine, little wind	.10	62	Clear
19	.10	52	Ditto	.22	65½	Fine, thunder shower	.11	60	Cloudy, mild
20	.09	52½	Clear	.12	59	Clear and hot, little wind	.10	64½	Clear, calm
21	.13	54½	Ditto, calm	.13	61½	Ditto	.08	64½	Ditto
22	.07	55	Ditto	.14	66	Bright sun, sultry	.23	72	Bright sun, sultry
23	.12	62½	Ditto	.21	70½	Ditto	.26	75½	Clear, fine, sultry
24	.23	65½	Very fine, mild	.10	71½	Hot, sultry, slight haze	.10	74½	Clear, calm
25	.15	62	Foggy, mild	.13	69	Ditto	.10	76½	Cloudy, mild
26	.09	66½	Cloudy, calm	.13	66½	Cloudy, little wind	.13	66	Clear, fine
27	.10	59½	Cloudy	.10	65½	Clear, very fine, dry	.13	67½	Ditto
28	.15	59½	Clear, calm	.24	67½	Fine, little wind	.26	67	Cloudy, mild
29	.14	58½	Cloudy, slight rain	.15	63	Hot and dry, brisk wind	.21	63	Clear, fine
30	.10	56	Cloudy	.20	58½	Overcast, brisk wind	.17	61	Showery, cold
31	.08	57½	Cloudy, cold wind	.13	61½	Cloudy, brisk wind	.10	60½	Fine, brisk wind
	3.77 Total.	54.81 Average.		4.81 Total.	62.62 Average.		5.13 Total.	65.17 Average.	

Greatest night growth on the 24th.
Least .. .. 22nd.

Greatest morning growth on the 13th.
Least .. 5th, 24th and 27th.

Greatest afternoon growth on the 11th.
Least .. .. .. 4th.

Average night growth	.13
—— morning growth	.16
—— afternoon growth	.17

Observations on the growth of the Scarlet Runner, taken at 4 A. M. (Night), 12 Noon (Morning), and 8 P. M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M.	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8 P. M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.34	..	Overcast
3	.29	56½	Cloudy	.36	59	Cloudy, little wind	.52	60	Ditto, calm
4	.72	56½	Rainy	1.80	61	Ditto, brisk wind	1.72	63½	Cloudy
5	.66	59½	Overcast	3.10	62½	Ditto, little wind	.22	62	Ditto
6	.51	55	Cloudy	.85	60	Ditto, calm	.60	63½	Ditto, mild
7	.40	59	Overcast, mild	.28	62½	Overcast, calm	3.15	63	Rain
8	.72	57	Ditto	.47	62½	Clear at intervals	3.37	66½	Clear, fine, calm
9	.86	61½	Cloudy, calm	2.91	65	Very fine sun, little wind	1.27	67½	Ditto, ditto, mild
10	.65	60½	Clear, fine, (dew)	.71	58	Ditto and light clouds	1.63	67½	Cloudy, mild
11	2.95	63	Clear, mild	.80	66	Ditto	1.55	67½	Ditto
12	1.22	60½	Cloudy	.55	60	Showery, brisk wind	1.10	60½	Cloudy, showery
13	.75	57	Ditto	.92	60½	Ditto	.48	62½	Rain
14	.56	60	Clear, brisk wind	2.43	61½	Clear, brisk wind	.75	61	Clear and fine
15	.98	57	Clear, very fine	.74	62½	Clear and dry, little wind	.82	65	Ditto
16	.62	55	Slightly overcast	2.91	56	Overcast, little wind	.67	61	Ditto
17	.58	54	Clear	2.69	60½	Slight haze, little wind	.83	65	Cloudy, fine
18	.70	56	Cloudy, calm	3.04	62	Very fine, little wind	.74	62	Clear
19	.68	52	Ditto	2.54	65½	Fine, thunder shower	.85	60	Cloudy, mild
20	.52	52½	Clear	3.04	59	Clear and hot, little wind	.95	64½	Clear, calm
21	.32	54½	Ditto, calm	.65	61½	Ditto	3.54	64½	Ditto
22	.74	55	Ditto	2.98	66	Bright sun, sultry	1.97	72	Bright sun, sultry
23	.64	62½	Ditto	2.91	70½	Ditto	1.42	75½	Clear, fine, sultry
24	.75	65½	Very fine, mild	2.75	71½	Hot, sultry, slight haze	2.10	74½	Clear, calm
25	.65	62	Foggy, mild	3.40	69	Ditto	1.77	76½	Cloudy, mild
26	.75	66½	Cloudy, calm	3.00	66½	Cloudy, little wind	2.14	66	Clear, fine
27	1.12	59½	Cloudy	.85	65½	Clear, very fine, dry	3.93	67½	Ditto
28	.74	59½	Clear, calm	.67	67½	Fine, little wind	3.59	67	Cloudy, mild
29	1.68	58½	Cloudy, slight rain	.87	63	Hot and dry, brisk wind	3.87	63	Clear, fine
30	.70	56	Cloudy	.97	58½	Overcast, brisk wind	.96	61	Showery, cold
31	.65	57½	Cloudy, cold wind	.92	61½	Cloudy, brisk wind	.66	60½	Fine, brisk wind
	23.11 Total.	54.81 Average.		50.21 Total.	62.62 Average.		47.51 Total.	65.17 Average.	

Greatest night growth on the 11th.
Least . .. 3rd.

Greatest morning growth on the 25th.
Least .. .. 7th.

Greatest afternoon growth on the 27th.
Least .. .. .. 5th.

Average night growth	.79
——— morning growth	1.73
——— afternoon growth	1.57

Observations on the growth of the Fig,* taken at 4 A.M. (Night), 12 Noon, (Morning), and 8 P.M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P.M. to 4 A.M.	Remarks on the Weather at 4 A.M.	Growth.	Mean Temp. from 4 A.M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P.M.	Remarks on the Weather at 8 P.M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.25	..	Overcast
3	.04	56½	Cloudy	.37	59	Cloudy, little wind	.35	60	Ditto, calm
4	.03	56½	Rainy	.31	61	Ditto, brisk wind	.08	63½	Cloudy
5	.16	59½	Overcast	.31	62½	Ditto, little wind	.07	62	Ditto
6	.04	55	Cloudy	.27	60	Ditto, calm	.14	63½	Ditto, mild
7	.09	59	Overcast, mild	.07	62½	Overcast, calm	.06	63	Rain
8	.08	57	Ditto	.08	62½	Clear at intervals	.12	66½	Clear, fine, calm
9	.05	61½	Cloudy, calm	.06	65	Very fine sun, little wind	.02	67½	Ditto, ditto, mild
10	..	60½	Clear, fine, (dew)	.18	58	Ditto and light clouds	.05	67½	Cloudy, mild
11	.10	63	Clear, mild	.10	66	Ditto	.06	67½	Ditto
12	.03	60½	Cloudy	.16	60	Showery, brisk wind	.05	60½	Cloudy, showery
13	.04	57	Ditto	.13	60½	Ditto	.09	62½	Rain
14	.09	60	Clear, brisk wind	.05	61½	Clear, brisk wind	.08	61	Clear and fine
15	.13	57	Clear, very fine	.06	62½	Clear and dry, little wind	.05	65	Ditto
16	.08	55	Slightly overcast	.04	56	Overcast, little wind	.17	61	Ditto
17	.09	54	Clear	.08	60½	Slight haze, little wind	.03	65	Cloudy, fine
18	.03	56	Cloudy, calm	.03	62	Very fine, little wind	.02	62	Clear
19	..	52	Ditto	.02	65½	Fine, thunder showers	.03	60	Cloudy, mild
20	..	52½	Clear	.03	59	Clear and hot, little wind	.03	64½	Clear, calm
21	.01	54½	Ditto, calm	.03	61½	Ditto	.02	64½	Ditto
22	.06	55	Ditto	.02	66	Bright sun, sultry	..	72	Bright sun, sultry
23	.09	62½	Ditto	.13	70½	Ditto	.04	75½	Clear, fine, sultry
24	.16	65½	Very fine, mild	..	71½	Hot sultry, slight haze	.04	74½	Clear, calm
25	.06	62	Foggy mild	.10	69	Ditto	.05	76½	Cloudy, mild
26	.04	66½	Cloudy, calm	.16	66½	Cloudy, little wind	.02	66	Clear, fine
27	.04	59½	Cloudy	.05	65½	Clear, very fine, dry	.04	67½	Ditto
28	.04	59½	Clear, calm	.07	67½	Fine, little wind	.06	67	Cloudy, mild
29	..	58½	Cloudy, slight rain	.12	63	Hot, and dry, brisk wind	.05	63	Clear, fine
30	.03	56	Cloudy	.07	58½	Overcast, brisk wind	..	61	Showery, cold
31	.02	57½	Cloudy, cold wind	.06	61½	Cloudy, brisk wind	.05	60½	Fine brisk wind
	1.63 Total.	54.81 Average.		3.16 Total.	62.62. Average.		2.12 Total.	65.17 Average.	

Greatest night growth on the 15th, 24th.
Least .. 10th, 19th, 20th, and 29th.

Greatest morning growth on the 3d.
Least 24th

Greatest afternoon growth on the 3d.
Least — — 27th, and 30th.

Average night growth	.05
——— morning growth	.10
——— afternoon growth	.07

* The Fig having been recently planted, and the Season being very dry, this Experiment is not so conclusive as it otherwise would have proved.

Observations on the growth of the Jerusalem Artichoke taken at 4 A. M. (Night), 12 Noon (Morning), and 8 P. M. (Afternoon), during July 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M.	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8 P. M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	.37	.	Overcast
3	.26	56½	Cloudy	.69	59	Cloudy, little wind	.38	60	Ditto, calm
4	.36	56½	Rainy	.92	61	Ditto, brisk wind	.48	63½	Cloudy
5	.58	59½	Overcast	.63	62½	Ditto, little wind	.41	62	Ditto
6	.47	55	Cloudy	.75	60	Ditto, calm	.45	63½	Ditto, mild
7	.62	59	Overcast, mild	.38	62½	Overcast, calm	.78	63	Rain
8	.36	57	Ditto	.40	62½	Clear at intervals	.56	66½	Clear, fine, calm
9	.51	61½	Cloudy, calm	.40	65	Very fine sun, little wind	.42	67½	Ditto, Ditto, mild
10	.27	60½	Clear, fine (dew)	.67	58	Ditto and light clouds	.31	67½	Cloudy, mild
11	.29	63	Clear, mild	.37	66	Ditto	.36	67½	Ditto
12	.18	60½	Cloudy	.34	60	Showery, brisk wind	.29	60½	Cloudy, showery
13	.23	57	Ditto	.24	60½	Ditto	.30	62½	Rain
14	.33	60	Clear, brisk wind	.41	61½	Clear, brisk wind	.43	61	Clear and fine
15	.21	57	Clear, very fine	.14	62½	Clear and dry, little wind	.10	65	Ditto
16	.25	55	Slightly overcast	.40	56	Overcast, little wind	.16	61	Ditto
17	.12	54	Clear	.26	60½	Slight haze, little wind	.19	65	Cloudy, fine
18	.11	56	Cloudy, calm	.17	62	Very fine, little wind	.19	62	Clear
19	.07	52	Ditto	.19	65½	Fine thunder shower	.14	60	Cloudy, mild
20	.10	52½	Clear	.21	59	Clear and hot, little wind	.07	64½	Clear, calm
21	.05	54½	Ditto, calm	.15	61½	Ditto	.36	64½	Ditto
22	.11	55	Ditto	.40	66	Bright sun, sultry	.19	72	Bright sun, sultry
23	.25	62½	Ditto	.31	70½	Ditto	.13	75½	Clear, fine, sutlry
24	.14	65½	Very fine, mild	.36	71½	Hot, sultry, slight haze	.37	74½	Clear, calm
25	.16	62	Foggy, mild	.49	69	Ditto	.44	76½	Cloudy, mild
26	.55	66½	Cloudy, calm	1.06	66½	Cloudy, little wind	.34	66	Clear, fine
27	.29	59½	Cloudy	.78	65½	Clear, very fine, dry	.33	67½	Ditto
28	.34	59½	Clear, calm	.43	67½	Fine, little wind	.76	67	Cloudy, mild
29	.55	58½	Cloudy, slight rain	.41	63	Hot and dry, brisk wind	.26	63	Clear, fine
30	.33	56	Cloudy	.13	58½	Overcast, brisk wind	.17	61	Showery, cold
31	.14	57½	Cloudy, cold wind	.18	61½	Cloudy, brisk wind	.24	60½	Fine, brisk wind
	8.23 Total.	54.81 Average.		12.27 Total.	62.62 Average.		9.98 Total.	65.17 Average.	

Greatest night growth on the 7th.
Least .. .. .. 21st.

Greatest morning growth on the 26th.
Least .. .. 30th.

Greatest afternoon growth on the 7th.
Least .. .. 20th.

Average night growth .28
——— morning growth .42
——— afternoon growth .33

Observations on the growth of the Spanish Gourd, taken at 4 A. M. (Night), 12 Noon, (Moning), and 8 P. M. (Afternoon), during July, 1844.

	NIGHT.			MORNING.			AFTERNOON.		
1844.	Growth.	Mean Temp. from 8 P. M. to 4 A. M.	Remarks on the Weather at 4 A. M.	Growth.	Mean Temp. from 4 A. M. to 12 Noon.	Remarks on the Weather at 12 Noon.	Growth.	Mean Temp. from 12 Noon to 8 P. M.	Remarks on the Weather at 8 P. M.
Jul.	In.			In.			In.		
2	..	..	.. ..	..	..	.. ..	1.01	..	Overcast
3	.87	56½	Cloudy	.45	59	Cloudy, little wind	1.21	60	Ditto, calm
4	.62	56½	Rainy	.92	61	Ditto, brisk wind	.93	63½	Cloudy
5	.80	59½	Overcast	.69	62½	Ditto, little wind	.90	62	Ditto
6	.84	55	Cloudy	.50	60	Ditto, calm	1.15	63½	Ditto, mild
7	.82	59	Overcast, mild	.69	62½	Overcast, calm	.74	63	Rain
8	.73	57	Ditto	1.34	62½	Clear at intervals	2.34	66½	Clear, fine, calm
9	1.49	61½	Cloudy, calm	1.20	65	Very fine sun, little wind	2.83	67½	Ditto, ditto, mild
10	.77	60½	Clear, fine, (dew)	1.18	58	Ditto and light clouds	2.20	67½	Cloudy, mild
11	1.91	63	Clear, mild	2.20	66	Ditto	1.52	67½	Ditto
12	1.97	60½	Cloudy	1.47	60	Showery, brisk wind	1.47	60½	Cloudy, showery
13	1.20	57	Ditto	1.55	60½	Ditto	1.13	62½	Rain
14	1.43	60	Clear, brisk wind	1.09	61½	Clear, brisk wind	1.28	61	Clear and fine
15	1.28	57	Clear, very fine	1.11	62½	Clear and dry, little wind	1.14	65	Ditto
16	1.22	55	Slightly overcast	.70	56	Overcast, little wind	1.46	61	Ditto
17	.82	54	Clear	.39	60½	Slight haze, little wind	1.57	65	Cloudy, fine
18	1.02	56	Cloudy, calm	1.08	62	Very fine, little wind	1.27	62	Clear
19	1.30	52	Ditto	.76	56½	Fine, thunder shower	1.06	60	Cloudy, mild
20	.71	52½	Clear	.56	59	Clear and hot, little wind	1.38	64½	Clear, calm
21	.50	54½	Ditto, calm	.75	61½	Ditto	1.12	64½	Ditto
22	.43	55	Ditto	.89	66	Bright sun, sultry	.82	72	Bright sun, sultry
23	.50	62½	Ditto						
24	***								
	21.23 Total.			19.52 Total.			28.53 Total.		

Greatest night growth on the 12th.
Least .. 21st, 22nd, 23rd.

Greatest morning growth on the 11th.
Least .. .. 17th.

Greatest afternoon growth on the 9th.
Least .. .. 7th.

Average night growth	1.01
——— morning growth	.97
——— afternoon growth	1.35

*** Broken in taking the measure, the shoot having become much curved at the extremity

Table shewing the amount of growth of all the foregoing plants during the months of both July and August.

		NIGHT.	MORNING.	AFTERNOON.
Hop . .	July	42.02 (1.44 av.)	40.12 (1.38 av.)	+60.41 (2.01 av.)
Vine . . .	July	+ 2.34 (.08 av.)	2.04 (.07 av.)	2.16 (.07 av.)
	August	.86	+1.94	1.64
Sweet Willow .	July	3.77 (.13 av.)	4.81 (.16 av.)	+5.13 (.17 av.)
	August	2.16	3.79	+4.44
Scarlet Runner .	July	23.11 (.79 av.)	+50.21 (1.73 av.)	47.15 (1.57 av.)
	August	8.86	9.93	+11.32
Fig . .	July	1.63 (.05 av.)	+3.16 (.10 av.)	2.12 (.07 av.)
	August	.71	+1.50	1.07
Jerusalem Artichoke	July	8.23 (.28 av.)	+12.27 (.42 av.)	9.98 (.33 av.)
	August	4.15	+7.09	6.95
Spanish Gourd .	July	21.23 (1.01 av.)	19.52 (.97 av.)	+28.53 (1.35 av.)
	Total	119.07	156.26	180.90

The examination of these tables shews that the same discrepancies as were remarked on the former occasion, when the plants under observation were growing in a hothouse, occur when the plants are exposed to the open air; and prove conclusively that those discrepancies were not owing to the artificial state in which the experimental specimens were placed.

The period of the day at which the greatest growth takes place still proves to be the afternoon, if all the experiments are regarded as but one; for the numbers stand thus: night 119.07, morning 156.26, afternoon 180.90; but when the experiments are separated it then appears that the period of maximum growth varies with the species; in the Hop, Sweet Willow and the Gourd it was the afternoon; in the Fig and Jerusalem Artichoke it was the morning; in the Vine it was the night in July and the morning in August; in the Scarlet Runner the morning in July and the afternoon in August. It is especially worthy of observation that this does not correspond with the observations of 1843, for at that time the Willow, which in 1844 grew upon the whole fastest in the after-

noon, that is to say in the hottest and brightest part of the 24 hours, increased most in the morning which was the coolest and most overcast. So again the Fig grew fastest in 1844 when exposed to the cool of the morning, and uninterrupted light; but in 1843 its maximum growth took place, between 6 in the afternoon and 12 at night, at which time it could have received little or no sunshine.

If we attempt to reconcile these conflicting results we shall find the separate as perplexing as the general observations. For instance, the greatest morning growth of the Jerusalem Artichoke and the Vine took place on the 26th; but at the same time the Hop, Sweet Willow and Fig were growing slowly, and even the Scarlet Runner, which resembled the Vine and Artichoke most nearly, had not reached its maximum. The greatest afternoon growth of the Jerusalem Artichoke and the Hop was on the 7th, but at that time the Vine, which had previously corresponded with the former, scarcely exceeded its average rate; the growth of the Scarlet Runner was considerable; the Fig however was below its average, and the Gourd had reached its minimum. So again on the 3rd, when the Hop grew slower than at any other period during the month, the Fig made its maximum growth; on the 27th while the Vine and Scarlet Runner grew fastest, the Fig grew slowest, and the same thing happened between these plants on the 27th. Similar instances will be found on an attentive scrutiny of the tables.

If however, there are so many instances of discrepancy, there are also some of correspondence. Thus, the Jerusalem Artichoke and the Vine not only made their maximum morning growth on the 26th, but their minimum night growth on the 21st; in like manner the Fig and the Sweet Willow which made their maximum night growth on the 24th, also made their minimum morning growth at the same time: an unexpected result amidst so much conflicting matter, when the totally different nature of the plants is taken into account. These however seem to be

mere coincidences, for there is little accordance between the plants at other times; for example, if we compare the Vine and Jerusalem Artichoke as to their rate of growth at other periods near to those when they are alike, we again find nothing but dissimilitude. Thus,

	Vine.			Jerusalem Artichoke.		
	Night. (.08 *av.*)	Morning. (.07 *av.*)	Afternoon. (.07 *av.*)	Night. (.28 *av.*)	Morning. (.42 *av.*)	Afternoon. (.33 *av.*)
July 20	.09	.04	.03	.10	.21	.07
21	—.02	.03	.04	—.05	.15	.36
22	.04	.09	.07	.11	.40	.19
25	.13	.11	.16	.16	.49	.44
26	.16	+.18	.10	.55	+1.06	.34
27	.11	.07	.20	.29	.78	.33

Here we see that although the Vine and Sweet Willow agreed on two occasions very near about the same time, they otherwise differed in the most singular manner. In the night of July 20th, the Vine was just above its average, but the Jerusalem Artichoke was not half way up to its average; and so on in the other cases.

If we next proceed to examine what the circumstances were which favoured or retarded the growth of the experimental plants, it will be found that there is scarcely more possibility of determining that point than of reconciling their differences with each other.

Plants are always said to grow fastest during a thunder storm, the peculiar electrical state of the atmosphere at that time being regarded peculiarly favourable to growth. Heat also is looked upon as a powerful cause of rapid developement, especially if in combination with moisture; on the other hand, cold is thought to produce the contrary effect. Finally a brisk wind, as well as bright light, is believed to impede vegetation, while warm overcast weather is favourable to growth. But the actual results hardly confirm those opinions.

On July 19th, there was a thunder storm in the morning, the thermometer being 65½°. The growth of the experimental plants on that occasion was as follows:

Hop	1.22 or .16 below the average.
Vine	.04 or .03 below the average.
Willow	.22 or .06 *above* the average.
Scarlet Runner	2.54 or .81 *above* the average.
Fig	.02 or .08 below the average.
Jerusalem Artichoke	.19 or .23 below the average.
Gourd	.76 or .31 below the average.

So that on this occasion, when the atmosphere was highly charged with electricity, five out of the seven experimental plants grew considerably below the average rate, and of the others one but little exceeded it. It might perhaps be supposed that the influence of the thunder storm would be felt shortly before and after its occurrence, rather than during its continuance; but that was not the fact.

On the occasion in question the growths immediately before and after the thunder storm were as follows:

	Before.	After.
Hop	.80 or .64 below the average	1.14 or .87 below the average
Vine	.04 or .06 below do.	.02 or .05 below do.
Willow	.10 or .03 below do.	.11 or .06 below do.
Scarlet Runner	.68 or .11 below do.	.85 or .72 below do.
Fig	.00 or .05 below do.	.03 or .04 below do.
Jerusalem Artichoke	.07 or .21 below do.	.14 or .19 below do.
Gourd	1.30 or .29 *above* do.	1.06 or .29 below do.

So that in every instance except one the average rate of growth was diminished, instead of being increased, and the night growth of the Fig was arrested altogether, an event which only happened on six other occasions, and then under circumstances equally unintelligible; on one of those occasions the thermometer was 58½° with rain; on another 71½° and hazy.

For the purpose of ascertaining the real effect of both high and low temperatures, the following tables have been drawn out.

Rate of growth under the *highest* Temperature.

	Night.		Morning.		Afternoon.	
	Temp.	Growth relative to average.	Temp.	Growth relative to average.	Temp.	Growth relative to average.
Hop . . .	65½ 66½	2.14 or .70 above 3.63 or 2.49 above	71½ 69	1.51 or .12 above 1.68 or .30 above	76½ 75½	2.52 or .51 above 2.70 or .69 above
Vine . . .	65½ 66½	.08 or average .16 or .8 above	71½ 69	.07 or average .11 or .04 above	76½ 75½	.16 or .09 above .10 or .03 above
Sweet Willow . .	65½ 66½	.23 or .10 above .09 or .04 *below*	71½ 69	.10 or .04 *below* .13 or .03 *below*	76½ 75½	.10 or .07 *below* .26 or .09 above
Scarlet Runner .	65½ 66½	.75 or .04 *below* .75 or .04 *below*	71½ 69	2.75 or 1.02 above 3.40 or 1.67 above	76½ 75½	1.77 or .20 above 1.42 or .15 above
Fig	65½ 66½	.16 or .11 above .04 or .01 *below*	71½ 69	.00 or .10 *below* .10 or average	76½ 75½	.05 or .02 *below* .04 or .03 *below*
Jerusalem Artichoke	65½ 66½	.14 or .14 *below* .55 or .27 above	71½ 69	.36 or .06 *below* .49 or .07 above	76½ 75½	.44 or .11 above .13 or .20 *below*
Gourd . . .	63	1.91 or .90 above	65½	.76 or .21 *below*	72	1.82 or .53 *below* 2.83 or 1.48 above
	62½	.50 or .61 *below*	66	.89 or .08 *below*	67½	2.20 or .85 above 1.52 or .17 above

Here we have no intelligible result, but the testimony is just as conflicting as in other cases. It is true that both the Hop and Vine were constantly above their average when exposed to the highest temperature, and at all periods of the day; that both these plants and the Sweet Willow and Fig, acquired their maximum night growth under those circumstances; that the Gourd also gained its greatest afternoon increase on one occasion of the highest temperature. But, on the other hand, while on one occasion a night temperature of 65½° gave the Willow its maximum growth, another night temperature of 66½° resulted in .04 below the average; indeed the Willow was below the average in 4 out of 6 instances of highest temperature. Then we find the Scarlet Runner always below the average at night at the very moment when others were acquiring their maximum; and in the case of the Gourd, which was exposed to an afternoon temperature of 67½° for three successive days, although on the first day it acquired its maximum, yet on the 2nd day afterwards it had fallen so low as .17 above the average, the circumstances remaining to all appearance the same.

Rate of growth under the *lowest* Temperature.

	Night.		Morning.		Afternoon.	
	Temp.	Growth relative to average.	Temp.	Growth relative to average.	Temp.	Growth relative to average
Hop	52	.80 or .64 below	56	.83 or .55 below	60	1.14 or .37 below
	52½	.63 or .81 below	58	.70 or .68 below	60½	1.55 or .46 below
Vine	52	.04 or .04 below	56	.07 or average	60	.02 or .05 below
	52½	.09 or .01 *above*	58	.05 or .02 below	60½	.03 or .04 below
Sweet Willow	52	.10 or .03 below	56	.18 or .02 *above*	60	.11 or .06 below
	52½	.09 or .04 below	58	.21 or .05 *above*	60½	.10 or .07 below
Scarlet Runner	52	.68 or .09 below	56	2 91 or 1.18 *above*	60	.85 or .72 below
	52½	.52 or .27 below	58	.71 or 1.72 below	60½	.66 or .91 below
Fig	52	.0 or .05 below	56	.04 or .06 below	60	.03 or .04 below
	52½	.0 or .05 below	58	.18 or .08 *above*	60½	.05 or .02 below
Jerusalem Artichoke	52	.07 or .21 below	56	.40 or .02 below	60	.14 or .19 below
	52½	.10 or .18 below	58	.67 or .25 *above*	60½	.24 or .09 below
Gourd	52	1.30 or .29 *above*	56	.70 or .27 below	60	1.06 or .29 below
	52½	.71 or .30 below	58	1.18 or .21 *above*	61	1.46 or .11 *above*

In this instance it is evident that in general the lowest temperatures were unfavourable to growth. But it is to be observed that the Vine attained its minimum growth on only one of these occasions (in the afternoon); that the Fig indicated the minimum night growth on two occasions; and, what is most inexplicable, we have 9 cases of the growth being actually above the average in presence of the lowest temperatures: such tender plants as the Fig, the Scarlet Runner and the Gourd (on three occasions out of six) being the species in which this singular anomaly took place.

It does not seem desirable to extend these tables further: for if the observations are analysed for the effects of wind or bright light, there are the same inexplicable discrepancies. Indeed the average of the afternoon growth being so much higher than that of the morning, as was shown in the table at p. 255, seems to render an examination into the effect of light superfluous; for it must be admitted that on an average we have more light between noon and 8 P.M., the time of the afternoon observations, than in either of the other periods.

I think no physiologist could have anticipated such results as these. They are in fact so much at variance with what could have been expected, that I should have been inclined to doubt the accuracy of the observations themselves, if I did not know that they were conducted with most scrupulous exactness, and by the method already described in my former report, (see page 103.) This seems as little open to error as any plan that could be contrived, and I have no doubt of its being a true representation of the facts as they occurred.

It therefore seems more than ever certain, that the conclusion to which the former observations pointed was correct, namely, that some agent, distinct from heat, light, or moisture, is in operation, the nature of which we have at present no means of ascertaining.

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XIII. *Journal of Meteorological Observations made in the Garden of the Horticultural Society at Chiswick during the year* 1844. *By Mr.* Robert Thompson.

This Journal has been kept on the same plan as the preceding.

JANUARY.

1844.	Days.	Morning. Barom.	Morning. Hygrometer.			Morning. Weather.	Noon. Barom.	Noon. Hygrometer.			Noon. Weather.	Night. Barom.	Night. Hygrometer.			Night. Weather.
M.	1	29.606	33	33	—	Snow & Sleet	29.562	37	37	—	Snowing	29.563	31	31	—	Clear & frosty
T.	2	—.485	32	32	—	Slightly Overcast	—.650	35	35	—	Clear	—.898	23	23	—	Ditto
W.	3	—.847	18	18	—	Severe frost	—.860	33	33	—	Overcast	—.626	39	39	—	Hazy
Th.	4	—.510	42	42	—	Hazy	—.608	50	50	—	Ditto	—.726	41	41	—	Foggy
○ F.	5	—.214	49	49	—	Overcast	—.569	54	54	—	Ditto	—.409	50	50	—	Rain
S.	6	—.214	46	46	—	Mild & fine	—.199	50	50	—	Ditto & fine	—.407	45	45	—	Cloudy
S.	7	—.558	40	39	1	Clear and fine	—.558	46	46	—	Clear & fine	—.656	30	30	—	Clear & frosty
M.	8	—.834	31	31	—	Clear, frosty	—.907	43	40	3	Fine	30.125	38	38	—	Slight rain
T.	9	30.326	36	32	4	Thick haze	30.320	37	27	10	Cold & dry	—.303	34	34	—	Overcast
W.	10	—.199	42	42	—	Hazy, drizzly	—.229	45	45	—	Fine	—.291	36	36	—	Ditto
Th.	11	—.338	36	36	—	Slightly Overcast	—.324	44	44	—	Overcast	—.328	37	37	—	Ditto
☾ F.	12	—.237	37	37	—	Foggy	—.120	42	42	—	Rain	29.992	41	41	—	Heavy rain
S.	13	—.013	40	40	—	Slight drizzle	—.004	43	43	—	Heavy clouds	—.988	38	38	—	Squally, rain
S.	14	—.139	38	38	—	Hazy and drizzly	—.116	40	40	—	Cloudy & fine	30 312	34	34	—	Densely overcast
M.	15	—.346	28	26	2	Clear & frosty	—.346	35	32	3	Ditto & cold	—.317	29	29	—	Clear & fro-ty
T.	16	—.292	22	22	—	Sharp frost	—.252	35	35	—	Very Fine	—.133	34	34	—	Densely overcast
W.	17	—.180	35	33	2	Slightly Overcast	—.186	42	40	2	Cloudy	—.197	39	39	—	Ditto
Th	18	—.190	42	42	—	Overcast	—.166	44	42	2	Overcast	—.150	41	41	—	Ditto
● F.	19	—.007	42	40	2	Fine	29.932	48	46	2	Densely clouded	29.932	41	41	—	Overcast
S.	20	—.003	39	36	3	Cloudy	30.017	43	32	11	Cold and dry	30.010	34	34	—	Ditto
S	21	29.919	42	40	2	Ditto	29 924	46	46	—	Overcast	29.955	39	39	—	Ditto
M.	22	—.902	37	37	—	Hazy	—.865	46	43	3	Very fine	—.919	30	30	—	Clear & frosty
T.	23	30.036	36	36	—	Foggy	30.052	45	35	10	Ditto	30.100	40	40	—	Overcast
W.	24	—.184	36	36	—	Slight fog	—.187	42	31	11	Ditto	—.242	31	31	—	Clear & frosty
Th.	25	—.262	32	32	—	Frosty	—.192	44	42	2	Ditto	—.188	42	42	—	Clear
F.	26	—.234	39	39	—	Fine	—.225	46	42	4	Ditto	—.282	37	37	—	Ditto
☽ S.	27	—.249	42	42	—	Cloudy	—.207	48	48	—	Slight rain	—.134	44	44	—	Cloudy
S.	28	29.891	48	48	—	Rain	29 833	53	48	5	Clear	29.900	40	40	—	Ditto
M.	29	—.977	39	39	—	Clear	—.947	49	49	—	Overcast	—.745	49	49	—	Squally
T.	30	—.826	45	42	3	Ditto	—.843	50	40	10	Fine	—.634	38	38	—	Showery
W.	31	— 799	34	34	—	Hail shower	—.801	39	39	—	Stormy showers	—.811	34	34	—	Densely clouded
		29.961	37.35	39 74	0.61		29.967	43.67	41.16	2.51		29.976	37.39	37.39	0.0	

JANUARY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	39	27	39	23	W	Little	.43
2	37	14	40	3	NW	Ditto	
3	42	32	43	30	W	Ditto	.24
4	51	34	50	32	——	Ditto	.05
5	54	44	59	42	SW	Ditto	.40
6	52	36	60	29	——	Ditto	
7	48	25	55	24	NW	Ditto	
8	44	35	55	33	N	Ditto	.01
9	40	33	50	29	SE	Ditto	.08
10	48	30	51	25	N	Ditto	.01
11	46	30	46	28	SW	Ditto	
12	44	35	44	34	——	Ditto	.76
13	44	35	44	32	N	Ditto	.03
14	40	26	47	23	NE	Brisk	.01
15	40	20	45	14	——	Little	
16	39	32	51	30	——	Ditto	
17	45	39	47	35	N	Ditto	
18	44	38	45	34	NW	Ditto	
19	48	37	48	32	W	Brisk	
20	48	28	51	24	N	Little	
21	47	34	49	33	W	Ditto	
22	49	26	57	22	SW	Ditto	
23	45	35	54	32	NE	Ditto	
24	43	23	53	18	SW	Ditto	
25	46	36	50	29	——	Ditto	.01
26	48	27	55	24	NW	Ditto	
27	50	39	51	36	SW	Ditto	.02
28	54	32	60	34	W	Brisk	.02
29	54	44	61	42	SW	Little	
30	51	32	53	29	W	Brisk	.03
31	41	26	41	22	NW	Ditto	.15
	45.84	31.74	50.12	28.29			2.25

Remarks.

The year commenced with snow and sleet; and the thermometer on the night of the 2nd was 18° below freezing. With this exception, however, there were no severe frosts throughout the month; and the temperature was 2½° above the average of nineteen preceding years, the period for which averages mentioned in these remarks have been calculated. The amount of rain exceeded the usual quantity by nearly ¾ of an inch. The morning of the 12th was foggy; heavy and continued rain fell throughout the day and night. The last day of the month was remarkable for stormy showers, forming a succession of hail, snow, sleet and rain.

Mean Pressure from the 3 daily observations	29.968 inches.
—— Temperature .... Ditto......	39°.47
—— Dew Point .... Ditto......	38°.43
—— Degree of Dryness ..... Ditto......	1°.04
—— Degree of Moisture .... Ditto......	.944
—— Force of Vapour .... Ditto......	.236 inch.
Least observed degree of Moisture	.660
Maximum Temperature in the Shade	54°.
Minimum Temperature in ditto	14°.
Maximum Temperature in the Sun	61°.
Minimum of Terrestrial Radiation	3°.
Mean Temperature of External Air	38°.79

WINDS.

North...... 5 days	N. East...... 4 days
South...... 0 ..	S. East ...... 1 ..
East........ 0 ..	N. West ..... 4 ..
West....... 8 ..	S. West...... 9 ..

31 days.

Amount of Rain ....2.25 inches.

FEBRUARY.

1844.	Days.	Morning. Barom.	Morning. Hygrometer.			Morning. Weather.	Noon. Barom.	Noon. Hygrometer.			Noon. Weather.	Night. Barom.	Night. Hygrometer.			Night. Weather.
Th.	1	29.954	28	24	4	Clear & frosty	30.018	36	25	11	Clear and dry	29.902	24	24	—	Clear, frosty
F.	2	—.490	32	32	—	Snowing	29.469	33	33	—	Snowing	—.596	31	31	—	Overcast
S.	3	—.934	31	31	—	Frosty	—.943	38	38	—	Bright sun	—.914	30	30	—	Ditto & frosty
○ S.	4	—.697	31	31	—	Snowing	—.565	36	36	—	Snowing	—.427	36	36	—	Thawing
M.	5	—.434	29	27	2	Frosty	—.403	38	32	6	Clear and fine	—.495	22	22	—	Clear & frosty
T.	6	—.560	28	28		Ditto	—.548	40	36	4	Ditto	—.459	33	33	—	Overcast
W.	7	—.258	38	38	—	Slight rain	—.272	43	43	—	Slightly overcast	—.177	45	45	—	Heavy rain
Th.	8	—.343	32	30	2	Clear, frosty	—.371	42	35	7	Very clear	—.309	30	30	—	Clear & frosty
F.	9	—.185	32	32	—	Frosty	—.171	42	42	—	Lightly clouded	—.164	35	35	—	Densely overcast
S.	10	—.417	35	33	2	Cloudy	—.531	40	39	1	Cloudy	—.639	34	34	—	Overcast
☾ S.	11	—.764	34	34	—	Small hail	—.808	40	34	6	Clear and fine	—.937	29	29	—	Clear & frosty
M.	12	—.993	31	30	1	Uniformly overcast	—.974	35	30	5	Ditto	—.982	28	28	—	Foggy & Do.
T.	13	30.086	23	23	—	Frosty, dense fog	30.090	30	30	—	Foggy	30.073	26	26	—	Ditto
W.	14	—.066	26	26	—	Ditto	—.033	41	41	—	Clearing	29.995	38	38	—	Overcast
Th.	15	29.944	40	37	3	Overcast, fine	29.919	45	41	4	Overcast	29.947	44	44	—	Rain
F.	16	30.146	32	32	—	Clear, frosty	30.161	46	38	8	Very fine	30.171	34	34	—	Fine
S.	17	—.108	37	37	—	Overcast	—.073	48	40	8	Overcast	29.983	37	37	—	Ditto
● S.	18	29.824	43	41	2	Ditto	29.773	45	45	—	Cloudy	—.558	42	42	—	Slight rain
M.	19	—.402	43	43	—	Clear	—.292	48	44	4	Densely clouded	—.498	34	34	—	Clear and windy
T.	20	—.765	30	30	—	Do. and frosty	—.792	39	35	4	Clear and fine	—.772	27	27	—	Do. & frosty
W.	21	—.528	31	31	—	Snowing	—.346	39	39	—	Sleet	—.235	35	35	—	Rain
Th.	22	—.262	33	33	—	Ditto	—.382	36	36	—	Snowing	—.660	26	26	—	Clear & frosty
F.	23	—.796	26	26	—	Frosty	—.651	40	30	10	Overcast	—.985	45	45	—	Heavy rain
S.	24	—.055	39	39	—	Clear and fine	—.216	45	37	8	Cloudy	—.614	33	33	—	Clear
S.	25	—.478	42	42	—	Rain	—.306	50	50	—	Rain	—.000	42	42	—	Cloudy
☽ M.	26	28.746	42	42	—	Showers	28.624	47	47	—	Cloudy	28.922	33	33	—	Stormy showers
T.	27	29.[illegible]82	28	25	3	Clear, frosty	29.447	37	27	10	Clear and cold	29.409	36	36	—	Overcast
W.	28	—.638	37	35	2	Ditto and cold	—.649	46	43	3	Fine	—.480	40	40	—	Cloudy & fine
Th.	29	—.595	35	35	—	Clear	—.553	49	43	6	Very fine	—.405	42	42	—	Rain
		29.584	33.37	32.65	0.72		29.599	41.17	37.55	3.62		29.610	34.17	34.17	0.0	

FEBRUARY.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	39	20	51	16	NW	Little	
2	39	28	50	20	E	Ditto	.32
3	40	23	50	20	N	Ditto	
4	40	25	45	21	S	Ditto	.18
5	40	19	52	14	NW	Ditto	
6	43	26	54	21	W	Ditto	.02
7	45	31	45	27	——	Ditto	.29
8	45	27	52	23	——	Brisk	.02
9	44	32	54	27	——	Little	.06
10	43	31	58	25	N	Ditto	
11	39	30	40	25	——	Brisk	.01
12	39	22	50	17	NW	Little	
13	32	23	50	20	W	Ditto	
14	42	32	49	29	SW	Ditto	
15	49	27	54	23	——	Ditto	.02
16	49	30	61	26	W	Ditto	
17	50	36	55	30	SW	Ditto	
18	49	39	51	37	S	Brisk	.05
19	50	29	59	22	SW	Ditto	.02
20	42	20	50	12	NW	Ditto	
21	42	32	42	32	SE	Little	.14
22	40	19	42	12	E	Brisk	.03
23	50	33	50	32	SW	Ditto	.44
24	51	27	54	21	NW	Little	.10
25	51	37	57	35	SW	Brisk	.10
26	52	26	61	23	——	Ditto	.26
27	40	32	55	27	NW	Little	
28	51	29	58	27	——	Ditto	.08
29	53	43	60	41	SW	Ditto	.13
	44.44	28.55	52.03	24.31			2.27

Remarks.

The temperature was upwards of 3° below the average; and with very few exceptions the nights throughout the month were more or less frosty. The barometer averaged considerably lower than usual; and in a corresponding degree, the amount of rain was greater. The weather throughout was very inconstant, and on the whole rather severe. A heavy fall of snow commenced, 4 A.M., on the morning of the 2nd, and fell to the depth of 4 inches in the course of the day. The barometer was exceedingly low on the 26th, on which heavy showers of rain occurred with intervals of sunshine; the night was boisterous.

Mean Pressure from the 3 daily observations 29.597 inches.
—— Temperature .... Ditto ...... 36°.23
—— Dew Point .... Ditto ...... 34°.79
—— Degree of Dryness .... Ditto ...... 1°.44
—— Degree of Moisture .. Ditto ...... .949
—— Force of Vapour .... Ditto ...... .206 inch.
Least observed degree of Moisture ...... .652
Maximum Temperature in the Shade .... 53°.
Minimum Temperature in ditto .... 19°.
Maximum Temperature in the Sun ...... 61°.
Minimum of Terrestrial Radiation ...... 12°.
Mean Temperature of External Air ...... 36°.49

WINDS.

North ...... 3 days	N. East......0 days
South .... 2 ..	S. East.......1 ..
East......... 2 ..	N. West......7 ..
West .... 6 ..	S. West...... 8 ..

29 days.

Amount of Rain................2.27 inches.

MARCH.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
F.	1	29.339	46	46	—	Cloudy, Fine	29.459	50	40	10	Fine	29.450	41	41	—	Clear
S.	2	—.429	41	41	—	Overcast	—.400	50	50	—	Showery	—.372	40	40	—	Squally
S.	3	—.365	44	44	—	Cloudy	—.359	48	48	—	Cloudy	—.427	39	39	—	Clear and fine
⊙ M.	4	—.357	40	40	—	Heavy rain	—.240	38	38	—	Heavy rain	—.513	35	35	—	Cloudy & Do.
T.	5	—.798	36	36	—	Overcast	—.806	40	30	10	Cloudy	—.762	26	26	—	Clear & frosty
W.	6	—.740	26	26	—	Clear & frosty	—.768	48	38	10	Fine	—.924	34	34	—	Ditto & fine
Th.	7	30.091	35	32	3	Cloudy	30.129	42	30	12	Cloudy & cold	30.189	35	35	—	Fine
F.	8	—.260	35	31	4	Fine	—.240	44	39	5	Very Fine	—.195	37	37	—	Overcast
S.	9	—.021	44	43	1	Densely overcast	29.949	55	52	3	Cloudy, mild	29.957	41	41	—	Ditto
S.	10	29.571	42	42	—	Heavy rain	—.624	40	40	—	Heavy rain	—.707	34	84	—	Clear
☾ M.	11	—.626	48	48	—	Boisterous, rain	—.468	54	54	—	Boisterous	—.495	39	39	—	Do. boisterous
T.	12	—.511	40	40	—	Very clear	—.483	39	39	—	Stormy showers	—.730	38	38	—	Ditto
W.	13	—.929	38	37	1	Ditto	—.954	44	44	—	Cloudy	—.952	34	34	—	Clear
Th.	14	—.892	38	38	—	Uniformly overcast	—.828	47	47	—	Rain	—.592	42	42	—	Heavy rain
F.	15	—.452	43	43	—	Rain	—.457	47	37	10	Fine	—.447	39	39	—	Clear
S.	16	—.460	45	45	—	Slight haze	—.558	50	48	2	Ditto	—.667	41	41	—	Overcast
S.	17	—.879	40	37	3	Overcast	—.893	43	40	3	Boisterous	—.972	35	35	—	Ditto
M.	18	30.010	35	30	5	Clear	—.985	44	32	12	Clear and cold	30.030	37	37	—	Ditto
● T.	19	—.020	43	42	1	Cloudy	30.039	48	40	8	Cloudy	29.897	41	41	—	Ditto
W.	20	29.580	43	40	3	Ditto & cold	29.450	46	46	—	Rain	—.811	30	30	—	Clear & frosty
Th.	21	30 003	34	32	2	Very clear	30.017	46	33	13	Fine	—.921	33	33	—	Clear
F.	22	29.739	42	41	1	Overcast	29.639	47	47	—	Cloudy	—.503	41	41	—	Slight rain
S.	23	—.513	42	42	—	Ditto	—.533	48	43	5	Fine	—.570	33	33	—	Clear & fine
S.	24	—.513	47	47	—	Cloudy	—.655	46	46	—	Boisterous	—.602	40	40	—	Overcast
M.	25	—.644	42	42	—	Overcast	—.573	54	54	—	Overcast	—.578	45	45	—	Ditto
T.	26	—.617	49	45	4	Fine	—.660	55	45	10	Very Fine	—.805	47	47	—	Cloudy
☽ W.	27	—.851	50	50	—	Light haze	—.894	56	56	—	Overcast	30.032	49	49	—	Hazy
Th.	28	30.269	46	42	4	Fine	30.334	59	47	12	Very Fine	—.395	40	40	—	Clear
F.	29	—.505	39	39	—	Dense fog	—.462	58	43	15	Dry haze	—.441	39	39	—	Overcast
S.	30	—.373	44	43	1	Dry haze	—.317	55	37	18	Fine	—.283	41	41	—	Ditto
S.	31	—.235	45	44	1	Slight haze	—.187	56	48	8	Clear and fine	—.159	43	43	—	Ditto, foggy
		29.794	41.35	40.26	1.09		29.785	48.29	42.94	5.35		29.818	38.35	38.35	0.0	

MARCH.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	55	36	62	32	SW	Brisk	.04
2	52	37	57	32	W	Ditto	.04
3	50	37	57	33	SW	Ditto	.20
4	41	28	51	24	NE	Little	.48
5	43	19	55	13	——	Ditto	
6	43	30	52	25	N	Ditto	
7	44	26	53	25	——	Ditto	
8	49	35	61	30	S	Ditto	
9	58	34	63	30	SW	Brisk	
10	44	31	52	28	N	Ditto	.69
11	53	35	53	30	SW	Strong	.20
12	47	31	53	26	W	Ditto	.09
13	47	32	54	28	——	Brisk	
14	49	39	50	37	SW	Little	.48
15	53	30	58	26	W	Brisk	.04
16	53	38	62	37	E	Ditto	
17	44	30	48	27	NE	Strong	
18	46	35	48	30	——	Brisk	
19	51	36	56	32	NW	Ditto	
20	48	23	53	16	W	Ditto	.04
21	50	31	58	25	N	Little	
22	47	42	48	39	SW	Ditto	.05
23	52	26	64	21	W	Ditto	
24	48	35	54	33	SW	Strong	.03
25	56	43	62	40	——	Brisk	.06
26	60	46	67	43	W	Little	
27	60	41	62	37	SW	Ditto	
28	60	29	71	23	N	Ditto	
29	63	37	71	33	E	Ditto	
30	57	40	64	35	NE	Brisk	
31	60	38	72	35	E	Ditto	
	51.06	33.87	57.77	29.84			2.44

Remarks.

The weather was frequently boisterous with heavy rains and on the whole very unsettled. The temperature was a little below the average. The amount of rain was an inch above the usual quantity. The mean height of the barometer was considerably below the average; but the pressure was in no instance remarkably low. The 11th, 12th, 17th, 20th and 24th were very boisterous. As in the two preceding months, West and South-west winds were prevalent.

Mean Pressure from the 3 daily observations 29.799 inches.
—— Temperature .... Ditto ...... 42°.66
—— Dew Point .... Ditto ...... 40°.51
—— Degree of Dryness ... Ditto ...... 2°.15
—— Degree of Moisture .. Ditto ...... .923
—— Force of Vapour ..... Ditto ...... .255 inch.
Least observed degree of Moisture ...... .526
Maximum Temperature in the Shade .... 63°.
Minimum Temperature in ditto .... 10°.
Maximum Temperature in the Sun ...... 72°.
Minimum of Terrestrial Radiation ...... 13°.
Mean Temperature of External Air ..... 42°.46

WINDS.

North ...... 5 days	N. East...... 5 days
South ...... 1 ..	S. East...... 0 ..
East .... 3 ..	N. West..... 1 ..
West....... 7 ..	S. West ..... 9 ..

31 days.

Amount of Rain.................. 2.44 inches.

APRIL.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
M.	1	30.223	42	42	—	Foggy	30.190	62	50	12	Dry haze	30.170	41	41	—	Clear and fine
T.	2	—.130	45	45	—	Very fine	—.022	67	48	19	Very fine	29.970	45	42	3	Ditto
○ W.	3	29.830	52	46	6	Clear and fine	29.757	67	45	22	Clear & dry	—.704	45	43	2	Ditto
Th.	4	—.634	52	48	4	Very fine	—.624	62	50	12	Very fine	—.588	53	53	—	Ditto
F.	5	—.719	50	50	—	Overcast	—.740	56	36	20	Ditto	—.785	42	42	—	Ditto
S.	6	—.839	49	46	3	Slight haze	—.874	62	40	22	Ditto	—.947	45	42	3	Ditto
S.	7	30.095	47	43	4	Clear	30.115	57	41	16	Ditto, clear	30.247	37	37	—	Ditto
M.	8	—.386	38	38	—	Foggy	—.391	60	39	21	Ditto	—.399	42	39	3	Ditto
☾ T.	9	—.480	47	42	5	Fine	—.455	64	37	27	Clear & dry	—.441	45	43	2	Ditto
W.	10	—.386	50	45	5	Very fine	—.290	69	40	29	Hot and dry	—.116	41	41	—	Ditto
Th.	11	29.998	47	40	7	Do. and clear	29.926	60	40	20	Fine	29.914	49	47	2	Cloudy, fine
F.	12	—.968	46	46	—	Fine	—.913	60	40	20	Ditto	—.685	45	45	—	Heavy rain
S.	13	—.689	51	51	—	Cloudy	—.759	55	50	5	Cloudy	—.798	49	49	—	Rain
S.	14	—.886	55	50	5	Ditto	—.955	55	55	—	Hazy	30.026	49	49	—	Showery
M.	15	30.019	49	49	—	Hazy	30.078	64	55	9	Very fine	—.117	49	49	—	Overcast
T.	16	—.161	54	54	—	Ditto	—.187	60	55	5	Cloudy	—.111	46	46	—	Clear and fine
● W.	17	—.206	52	52	—	Foggy	—.137	68	55	13	Very fine	—.095	49	47	2	Ditto
Th.	18	—.124	55	55	—	Slightly clouded	—.150	59	49	10	Cloudy, fine	—.224	44	44	—	Ditto
F.	19	—.351	47	38	9	Clear	—.337	64	38	26	Very fine	—.307	50	47	3	Slightly overcast
S.	20	—.274	53	48	5	Fine	—.259	67	52	15	Ditto	—.108	58	55	3	Ditto
S.	21	—.118	58	48	10	Very fine	—.197	69	51	18	Ditto	—.149	55	51	4	Cloudy
M.	22	—.143	56	50	6	Fine	—.124	66	50	16	Ditto	—.233	55	52	3	Overcast
T.	23	—.234	52	42	10	Ditto, clear	—.169	63	45	18	Ditto	—.090	50	46	4	Clear and fine
W.	24	—.070	53	50	3	Fine	—.104	63	43	20	Ditto	—.178	45	39	6	Ditto
☽ Th.	25	—.198	51	41	10	Slight haze	—.146	69	49	20	Ditto	—.062	50	47	3	Ditto
F.	26	—.014	54	51	3	Very fine	29.967	70	43	27	Dry Haze	—.080	55	55	—	Ditto
S.	27	—.203	50	39	11	Clear and dry	30.221	59	34	25	Clear & fine	—.284	45	41	4	Ditto
S.	28	—.359	53	38	15	Ditto	—.340	63	38	25	Ditto	—.300	41	39	2	Ditto
M.	29	—.280	49	39	10	Fine	—.242	55	42	13	Dry haze	—.199	42	39	3	Cloudy
T.	30	—.243	52	50	2	Dry haze	—.258	63	31	32	Clear, very dry	—.277	45	42	3	Clear
		30.108	50.30	45.87	4.41		30.097	62.60	44.70	17.90		30.086	46.90	45.07	1.83	

APRIL.

Temperature.					Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	65	29	78	23	NE	Little	
2	72	29	80	26	SW	Ditto	
3	72	32	75	26	——	Brisk	
4	68	38	76	33	——	Little	
5	58	34	62	27	N	Ditto	.01
6	62	32	71	27	E	Ditto	
7	62	25	68	20	NE	Ditto	
8	68	27	73	22	SW	Ditto	
9	73	29	78	22	W	Ditto	
10	65	28	75	21	S	Ditto	
11	62	34	68	30	SW	Ditto	
12	62	45	70	40	——	Ditto	.23
13	59	47	65	46	W	Ditto	.02
14	60	41	72	38	NW	Ditto	.02
15	66	48	71	42	SW	Ditto	
16	70	36	80	32	——	Ditto	.01
17	71	36	80	32	E	Ditto	
18	61	30	69	24	NW	Ditto	.01
19	66	42	74	37	N	Ditto	
20	67	45	74	41	W	Ditto	
21	70	38	77	34	——	Ditto	
22	70	39	77	33	SW	Ditto	
23	71	39	80	35	W	Ditto	
24	71	31	83	24	——	Ditto	
25	73	33	84	28	S	Ditto	
26	72	45	84	42	NE	Ditto	.03
27	64	29	80	23	N	Ditto	
28	66	30	81	24	NE	Ditto	
29	66	38	80	34	E	Brisk	
30	66	37	80	32	——	Ditto	
	66.60	35.53	75.50	30.60			0.33

Remarks.

This month was very dry; the days hot for the period of the season and the nights cold and often frosty. In 12 of the latter the thermometer was at, or below the freezing point; but 18 nights were indicated by the Radiating thermometer as being more or less frosty. The barometer stood high. The amount of rain was less than in any corresponding month for at least 19 preceding years, with the exception of 1842. The degree of dryness as indicated by the hygrometer was unusually great, especially on the 9th, 10th, 26th; and on the 30th, it attained almost the highest pitch of dryness ever observed in this country.

Mean Pressure from the 3 daily observations 30.097 inches.
—— Temperature .... Ditto ...... 53°.26
—— Dew Point .... Ditto ...... 45°.21
—— Degree of Dryness ... Ditto ...... 8°.05
—— Degree of Moisture .. Ditto ...... .743
—— Force of Vapour. .... Ditto ...... .302 inch.
Least observed degree of Moisture .... .312
Maximum Temperature in the Shade ...... 73°.
Minimum Temperature in ditto .... 25°.
Maximum Temperature in the Sun ...... 84°.
Minimum of Terrestrial Radiation ...... 20°.
Mean Temperature of External Air ..... 51°.06

WINDS.

North..... 3 days	N. East...... 4 days
South...... 2 ..	S. East....... 0 ..
East....... 4 ..	N. West..... 2 ..
West....... 6 ..	S. West...... 9 ..

30 days.

Amount of Rain........................ 0.33 inches.

MAY.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
W.	1	30.469	53	50	3	Dry haze	30.366	67	37	30	Excessively dry	30.400	48	43	5	Clear & fine
○ Th.	2	—.432	55	46	9	Cloudless	—.400	68	40	28	Ditto	—.336	46	41	5	Ditto
F.	3	—.213	55	50	5	Ditto	—.153	63	33	30	Ditto	—.138	48	41	7	Cloudy
S.	4	—.132	53	53	—	Slight rain	—.103	57	52	5	Cloudy	—.090	50	47	3	Overcast
S.	5	—.060	52	52	—	Overcast	—.016	70	61	9	Overcast & fine	29.913	51	47	4	Clear & fine
M.	6	29.867	58	53	5	Fine	29.818	71	45	26	Ditto	—.791	47	45	2	Ditto
T.	7	—.792	56	53	3	Very Fine	—.797	69	44	25	Fine	—.868	48	45	3	Cloudy
W.	8	—.947	55	53	2	Ditto	—.945	68	55	13	Dry haze	—.944	54	49	5	Overcast
☾ Th.	9	- .962	61	50	11	Ditto	—.937	72	48	24	Sultry	—.933	53	49	4	Clear & fine
F.	10	—.942	58	58	—	Overcast	—.931	65	50	15	Very Fine	—.910	45	39	6	Ditto
S.	11	—.931	53	50	3	Very Fine	—.976	65	41	24	Ditto	30.060	52	48	4	Overcast
S.	12	30.183	59	52	7	Overcast	30.221	70	50	20	Ditto	—.262	47	47	—	Clear & fine
M.	13	—.335	62	52	10	Fine	—.319	74	49	25	Sultry	—.309	52	49	3	Ditto
T.	14	—.322	61	55	6	Ditto	—.272	66	55	11	Very Fine	—.294	55	51	4	Overcast
W.	15	—.365	54	44	10	Light clouds	—.285	59	40	19	Cloudy, fine	—.318	44	42	2	Clear
Th.	16	—.242	55	45	10	Ditto	—.123	64	39	25	Ditto	29 961	51	48	3	Overcast
● F.	17	29.886	55	52	3	Ditto	29.900	59	42	17	Cloudy, windy	—.964	38	36	2	Clear
S	18	—.927	45	40	5	Cloudy & cold	—.935	48	48	—	Boisterous	—.989	38	34	4	Ditto
S.	19	—.961	55	37	18	Boisterous	—.956	59	41	18	Ditto	—.997	44	39	5	Ditto
M.	20	—.983	52	42	10	Ditto	—.982	62	46	16	Cold & dry	—.983	45	42	3	Overcast
T.	21	—.858	50	50	—	Drizzly	—.882	60	57	3	Overcast	—.926	52	52	—	Ditto
W.	22	30.146	56	53	3	Dry haze	30.151	67	60	7	Very Fine	30.164	49	49	—	Ditto
Th.	23	—.136	54	54	—	Cold haze	—.101	60	60	—	Hazy	—.086	48	45	3	Ditto
F.	24	.076	53	45	8	Cloudy & cold	—.003	64	47	17	Fine	29.968	49	45	4	Ditto
☽ S.	25	—.019	52	49	3	Overcast & ditto	—.026	62	48	14	Ditto	30.103	43	39	4	Clear & fine
S.	26	.156	50	40	10	Ditto	—.174	57	38	19	Cloudy, cold	—.206	41	38	3	Ditto
M.	27	—.199	50	48	2	Ditto	—.154	55	42	13	Ditto	—.125	42	38	4	Ditto
T.	28	—.026	54	48	6	Light clouds	29.973	60	35	25	Ditto	29.956	47	45	2	Overcast
W.	29	29.935	50	48	2	Overcast & cold	—.927	54	54	—	Slight drizzle	—.933	44	44	—	Rain
Th.	30	30.002	50	50	—	Ditto	30.003	60	52	8	Cloudy	30.023	48	45	3	Cloudy
○ F.	31	—.035	50	45	5	Ditto	—.001	62	47	15	Fine	—.002	43	41	2	Clear
		30.082	54.06	48.93	5.13		30.059	63.13	46.97	16.16		30.063	47.16	43.97	3.19	

MAY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.	Remarks.
1	70	38	82	32	E	Brisk		
2	71	46	83	29	——	Little		
3	65	45	75	40	NE	Ditto		
4	59	48	60	41	——	Brisk	.01	
5	72	43	78	40	——	Ditto		
6	72	36	78	31	E	Little		
7	76	43	90	37	N	Ditto		
8	69	44	75	40	E	Ditto		
9	78	49	90	42	SW	Ditto		
10	68	38	80	32	W	Ditto	.07	
11	64	52	76	50	NE	Ditto		
12	72	41	85	36	——	Ditto		
13	78	39	90	36	——	Ditto		
14	70	38	90	31	——	Ditto		
15	60	41	85	37	——	Brisk		
16	65	40	87	34	——	Little		
17	59	32	69	24	——	Strong		
18	54	44	75	40	——	Ditto	.02	
19	60	43	76	39	——	Ditto		
20	63	40	75	36	——	Brisk		
21	62	46	80	44	——	Ditto	.02	
22	67	46	78	44	——	Little		
23	70	43	82	39	——	Ditto		
24	66	45	82	42	——	Ditto		
25	65	40	77	36	——	Ditto		
26	58	41	70	35	——	Brisk		
27	56	43	69	40	——	Ditto	.06	
28	59	48	68	44	E	Ditto		
29	58	44	66	43	NE	Ditto	.07	
30	61	45	73	41	——	Little		
31	61	42	72	37	E	Ditto		
	65.42	42.68	77.93	37.80			0.25	

Remarks.

This was an excessively dry month, uncongenial to most kinds of vegetation; for, excepting three days, the wind was constantly from north-east or east, very dry, and likewise cold, as appears from the temperature being a degree below the average, notwithstanding the abundance of sunshine. The very limited quantity of rain which fell at intervals was quickly evaporated; for the hygrometer indicated not only great dryness during the day, but also a considerable degree in the mornings and evenings, periods in which the air is generally found moist. The weather was very boisterous between the 17th and 20th inclusive.

Mean Pressure from the 3 daily observations		30.068 inches
—— Temperature	Ditto...	54°.78
—— Dew Point	Ditto...	46°.62
—— Degree of Dryness	Ditto...	8°.16
—— Degree of Moisture	Ditto...	·745
—— Force of Vapour	Ditto...	·319 inch.
Least observed degree of Moisture		·337
Maximum Temperature in the Shade		78°.
Minimum Temperature in ditto		32°.
Maximum Temperature in the Sun		90°.
Minimum of Terrestrial Radiation		24°.
Mean Temperature of External Air		54°.65

Winds.

North......	1 days	N. East....	22 days
South......	0 ..	S. East.....	0 ..
East........	6 ..	N. West....	0 ..
West.......	1 ..	S. West....	1 ..

31 days.

Amount of Rain .... 0.25 inches.

JUNE.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
S.	1	29.998	55	50	5	Clear	29.957	68	47	21	Fine	29.949	44	40	4	Clear
S.	2	—.960	51	48	3	Overcast and cold	—.953	64	49	15	Ditto	—.971	46	43	3	Cloudy
M.	3	30.057	55	45	10	Light Clouds	30.086	65	45	20	Very Fine	30.123	51	46	5	Ditto
T.	4	—.147	62	55	7	Very Fine	—.103	70	47	23	Ditto	—.057	51	47	4	Clear & Fine
W.	5	29 976	65	55	10	Overcast	29 915	74	50	24	Ditto	29.822	59	55	4	Ditto
Th.	6	—.720	58	58	—	Slight rain	—.714	67	67	—	Cloudy	—.834	56	53	3	Slightly clouded
☾ F.	7	—.890	64	60	4	Overcast	—.862	68	55	13	Boisterous	—.901	59	54	5	Clear
S.	8	30 057	63	50	13	Very Fine	30.040	71	50	21	Very Fine	30.001	54	49	5	Ditto
S.	9	29.992	64	64	—	Slight rain	29.983	72	56	16	Ditto	—.009	53	49	4	Ditto
M.	10	30 034	64	55	9	Fine	30.037	68	55	13	Cloudy	—.110	51	48	3	Ditto
T.	11	—.186	63	55	8	Clear and do.	—.173	71	47	24	Very Fine	—.143	58	53	5	Ditto
W.	12	—.166	63	51	12	Clear	—.131	73	53	20	Ditto	—.080	59	56	3	Overcast
Th.	13	—.003	69	55	14	Light Clouds	29.945	81	65	16	Ditto	29.940	59	54	5	Clear & fine
F.	14	— 030	62	51	11	Clear, Fine	30.016	72	48	24	Ditto	—.999	54	51	3	Ditto
S.	15	—.009	60	55	5	Very Fine	—.036	67	.38	29	Ditto	30.046	51	46	5	Ditto
● S.	16	—.179	63	47	16	Slightly clouded	—.197	67	43	24	Ditto	—.168	50	46	4	Ditto
M.	17	—.153	65	52	13	Hot & dry	— 067	70	48	22	Cloudy	29.925	56	53	3	Overcast
T.	18	29 757	62	62	—	Rain	29.690	69	55	14	Fine	—.676	53	53	—	Ditto
W.	19	—.858	55	55	—	Overcast	—.918	60	60	—	Heavy clouds	30.014	50	48	2	Cloudy, fine
Th.	20	30.041	58	58	—	Ditto.	—.985	65	62	3	Overcast	29.972	56	54	2	Ditto
F.	21	29.980	62	60	2	Light clouds	—.924	75	58	17	Very fine	—.761	58	56	2	Overcast
S.	22	— 769	67	60	7	Overcast	—.777	78	55	23	Ditto	—.797	53	49	4	Very fine
☽ S.	23	—.789	78	69	9	Clear and fine	—.758	86	65	21	Clear, Sultry	—.742	66	59	7	Ditto
M.	24	—.651	75	65	10	Cloudy & sultry	—.647	83	65	18	Hot, Ditto	—.642	60	56	4	Ditto
T.	25	—.618	61	61	—	Heavy rain	—.613	64	64	—	Constant Rain	—.666	49	49	—	Rain
W.	26	—.718	57	57	—	Cloudy	— 744	66	53	13	Light clouds, fine	—.784	55	55	—	Overcast
Th.	27	— 828	56	56	—	Overcast	—.828	63	52	11	Cloudy,	—.886	51	49	2	Ditto
F.	28	—.949	60	55	5	Very fine	—.969	71	55	16	Very fine	30.016	55	52	3	Clear
S.	29	30.065	65	55	10	Ditto.	—.926	77	55	22	Ditto	29.999	56	54	2	Mild & fine
○ S.	30	29 936	67	60	7	Dry haze	—.868	72	63	9	Overcast, fine	—.850	54	51	3	Ditto
		29.950	62.30	55.97	6.33		29.929	70.57	54.17	16.40		29.929	54.23	50.93	3.30	

JUNE.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	72	44	88	40	NE	Brisk	
2	61	41	79	36	——	Ditto	
3	69	41	89	37	E	Little	
4	79	40	95	36	SW	Brisk	
5	79	53	95	50	——	Ditto	.06
6	70	53	83	53	——	Ditto	.02
7	71	50	84	46	——	Strong	
8	80	49	95	46	——	Little	.02
9	80	51	94	48	W	Ditto	.01
10	77	41	90	37	——	Ditto	
11	83	42	99	37	SW	Ditto	
12	82	56	98	53	——	Ditto	
13	85	52	100	48	——	Brisk	
14	75	49	89	44	W	Ditto	
15	78	43	90	39	——	Ditto	
16	78	40	92	37	NW	Ditto	
17	77	52	94	50	S	Little	.04
18	77	54	93	51	E	Ditto	.05
19	66	46	70	43	NW	Ditto	.02
20	74	53	82	52	W	Ditto	.01
21	83	52	99	48	SW	Brisk	
22	86	48	101	44	——	Little	
23	91	63	106	62	S	Brisk	
24	89	67	105	54	SW	Ditto	
25	65	47	65	46	——	Little	.62
26	67	51	86	51	N	Ditto	.12
27	68	50	85	47	——	Ditto	
28	74	47	86	43	W	Ditto	
29	83	54	97	50	SW	Ditto	
30	79	50	91	46	NE	Ditto	
	76.60	49.30	90.66	45.80			0.97

Remarks.

More rain fell in this month than in both the two preceding, yet the quantity was not equal to half the usual average. Till the 25th merely the surface of the ground was occasionally wetted; more fell on the day above mentioned than had previously fallen, in the whole amount, since the middle of April. It was found that even this quantity did not moisten lower than 6 inches in most soils; consequently the roots of trees were little benefited by it. The mean temperature was fully 2° above the average, the wind being chiefly from South-west and West, directly opposite to the cold points from which it came in the preceding month. Thunder occurred on the 18th; the 7th was very boisterous.

Mean Pressure from the 3 daily observations 29. 936 inches.
—— Temperature .... Ditto ..... 62°.37
—— Dew Point .... Ditto ..... 53°.69
—— Degree of Dryness ... Ditto ..... 8°.68
—— Degree of Moisture .. Ditto ..... .740
—— Force of Vapour ..... Ditto ..... .412 inch.
Least observed degree of Moisture ..... .355
Maximum Temperature in the Shade..... 91°.
Minimum Temperature in ditto .... 40°.
Maximum Temperature in the Sun .... 106°.
Minimum of Terrestrial Radiation ..... 36°.
Mean Temperature of External Air ..... 62°.95

Winds.

North.......2 days	N. East......3 days
South ....2 ..	S. East ......0 ..
East ....2 ..	N. West.....2 ..
West ....6 ..	S. West.....13 ..

30 days.

Amount of Rain............ 0.97 inches.

JULY.

1844.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
M.	1	29.853	63	60	3	Slight haze	29.842	72	65	7	Cloudy	29.829	55	55	—	Cloudy, thunder
T.	2	—.832	58	58	—	Rain	—.837	65	63	2	Ditto	—.841	59	59	—	Overcast
W.	3	—.876	58	58	—	Thickly overcast	—.849	64	64	—	Ditto	—.809	55	53	2	Cloudy & fine
Th.	4	—.638	60	60	—	Slight rain	—.612	66	66	—	Ditto	—.596	59	57	2	Ditto
F.	5	—.576	63	61	2	Fine	—.579	64	60	4	Ditto	—.656	56	56	—	Overcast
S.	6	—.809	60	55	5	Overcast	—.839	64	52	12	Ditto	—.878	57	57	—	Ditto
☾ S.	7	— 995	62	62	—	Hazy & mild	—.952	68	57	11	Overcast	—.929	56	56	—	Ditto
M.	8	—.931	59	55	4	Ditto	—.898	68	53	15	Very fine	—.856	60	60	-	Ditto
T.	9	—.854	62	60	2	Fine	—.850	70	53	17	Ditto	—.906	54	54	—	Clear & fine
W.	10	—.967	64	58	6	Very fine	—.953	70	55	15	Ditto	—.880	64	61	3	Cloudy & Do.
Th.	11	—.868	68	61	7	Ditto	—.880	73	55	18	Ditto	—.864	61	58	3	Clear
F.	12	—.870	63	57	6	Ditto	—.882	64	64	—	Showery	—.939	57	55	2	Fine
S.	13	—.905	65	58	7	Ditto	—.725	64	64	—	Rain	—.494	59	59	—	Heavy rain
S.	14	—.530	65	63	2	Ditto	—.557	70	55	15	Fine	—.679	58	57	1	Clear & fine
● M.	15	—.825	65	63	2	Ditto	—.809	70	50	20	Clear	—.928	53	50	3	Ditto
T.	16	—.975	62	55	7	Overcast & fine	—.949	63	55	8	Overcast	—.994	50	48	2	Ditto
W.	17	30.023	60	55	5	Fine	—.962	70	47	23	Dusky clouds	—.848	57	57	—	Hazy
Th.	18	29.752	60	55	5	Very fine	—.718	69	48	21	Very fine	—.722	52	50	2	Cloudy, fine
F.	19	—.723	60	55	5	Overcast, Do.	—.759	65	65	—	Thunder showers	—.891	53	53	—	Ditto
S.	20	30.067	60	57	3	Clear, Ditto	30.125	69	50	19	Very fine	30.174	50	50	—	Clear & fine
S.	21	—.275	64	58	6	Ditto	—.253	79	59	20	Clear & fine	—.227	55	55	—	Ditto
☽ M.	22	—.190	65	55	10	Ditto	—.121	75	55	20	Cloudless & hot	—.044	63	58	5	Ditto
T.	23	29.999	74	65	9	Ditto	29.944	82	60	22	Sultry	29.910	63	60	3	Ditto
W.	24	—.916	70	70	—	Sultry	—.916	83	71	12	Ditto	—.948	65	61	4	Ditto
Th	25	—.956	70	67	3	Ditto	—.904	88	70	18	Ditto	—.901	64	61	3	Cloudy, fine
F.	26	— 942	67	65	2	Overcast	—.908	71	67	4	Cloudy	30.110	56	52	4	Clear Do.
S.	27	30.161	66	60	6	Very fine	30.181	70	55	15	Hot and dry	—.177	57	52	5	Ditto
S.	28	—.197	73	62	11	Ditto	—.155	82	61	21	Clear & fine	—.005	58	56	2	Cloudy, fine
○ M.	29	29.965	65	55	10	Ditto	29.947	72	45	27	Hot and dry	29.959	55	51	4	Very clear
T.	30	—.828	57	52	5	Overcast	—.655	65	55	10	Overcast	—.474	56	56	—	Rain
W.	31	— 529	66	65	1	Cloudy	—.659	67	55	12	Cloudy, fine	—.708	53	50	3	Clear
		29.897	63.67	59.35	4.32		29.878	70.38	57.87	12.51		29.876	57.10	55.39	1.71	

JULY.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	79	54	93	53	S	Little	.34
2	69	53	86	51	N	Ditto	.22
3	72	57	86	53	SE	Ditto	.14
4	68	55	73	55	SW	Brisk	.01
5	70	50	86	48	NE	Little	.06
6	65	54	66	52	N	Ditto	.06
7	68	53	81	52	E	Ditto	.13
8	77	58	90	56	W	Ditto	
9	74	49	90	45	N	Ditto	
10	78	60	89	58	SW	Ditto	
11	78	56	91	54	W	Ditto	
12	78	56	80	52	——	Brisk	.06
13	71	56	84	53	SW	Ditto	.53
14	75	47	90	43	W	Ditto	
15	76	46	90	42	——	Little	
16	75	42	85	37	SW	Ditto	
17	73	52	84	50	N	Ditto	
18	73	45	89	43	W	Ditto	
19	74	44	87	42	N	Ditto	.39
20	76	43	90	41	NW	Ditto	
21	82	49	96	46	S	Ditto	
22	89	53	104	49	SW	Ditto	
23	89	61	105	52	E	Ditto	
24	87	53	103	50	——	Ditto	
25	92	62	108	59	S	Ditto	
26	74	55	89	50	NW	Ditto	
27	83	50	100	45	——	Ditto	
28	88	57	101	52	SW	Ditto	
29	76	44	101	39	NW	Brisk	
30	68	55	75	51	SW	Ditto	.14
31	72	49	83	44	W	Ditto	.02
	76.42	52.19	89.51	48.93			2.10

Remarks.

A high temperature was still maintained throughout this month. The period between the 21st and 28th was remarkably hot, the thermometer reaching between 80° and 90° in the shade, one day excepted. On the 25th it was as high as 92°. The quantity of rain was but little short of the average; yet the ground at some depth still continued dry. A very heavy thunder storm occurred on the afternoon of the 19th, accompanied with rain and hail. The air was very clear on the 20th; and then the hot period set in as above noticed. The first week was cloudy and wet; but with few exceptions the rest of the month was unusually bright, the sky being frequently quite cloudless.

Mean Pressure from the 3 daily observations 29.883 inches.
—— Temperature ....Ditto....... 63°.71
—— Dew Point ....Ditto....... 57°.53
—— Degree of Dryness ....Ditto....... 6°.18
—— Degree of Moisture....Ditto....... .781
—— Force of Vapour......Ditto....... .472 inch.
Least observed degree of Moisture........ .389
Maximum Temperature in the Shade ..... 92°.
Minimum Temperature in Ditto......... 42°.
Maximum Temperature in the Sun ..... 108°.
Minimum of Terrestrial Radiation ...... 37°.
Mean Temperature of External Air....... 64°.30

WINDS.

North......5 days	N. East ....1 days
South ......3 ..	S. East.....1 ..
East ....3 ..	N. West....4 ..
West ......7 ..	S. West ....7 ..

31 days.

Amount of Rain .... 2.10 inches.

AUGUST.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
Th.	1	29.732	60	51	9	Cloudy	29.743	60	49	11	Boisterous	29.807	49	47	2	Clear, fine
F.	2	—.868	58	33	5	Very clear	—.866	69	69	—	Very Fine	—.774	50	48	2	Cloudy & do.
S.	3	—.469	62	62	—	Showery	—.427	63	55	8	Boisterous	—.420	56	56	—	Stormy
S.	4	—.683	63	55	8	Dusky clouds	—.729	72	54	18	Clear & Fine	—.833	51	48	3	Clear & Fine
M.	5	—.833	62	58	4	Very Fine	—.808	70	60	10	Cloudy & Fine	—.632	60	60	—	Rain
☾ T.	6	—.522	67	67	—	Boisterous	—.530	69	60	9	Ditto	—.587	54	52	2	Clear & Fine
W.	7	—.640	61	55	6	Clear	—.621	69	69	—	Heavy showers	—.656	51	50	1	Ditto
Th.	8	—.614	60	60	—	Light clouds	—.630	69	54	15	Fine	—.712	53	51	2	Ditto
F.	9	—.756	59	56	3	Ditto & fine	—.750	70	51	19	Clear	—.733	54	52	2	Densely clouded
S.	10	—.744	55	52	3	Slight haze	—.591	66	45	21	Fine	—.709	48	48	—	Clear
S.	11	—.550	58	55	3	Very Fine	—.783	72	51	21	Slightly overcast	—.689	56	56	—	Rain
M.	12	—.374	63	63	—	Overcast	—.401	66	66	—	Heavy rain	—.608	57	57	—	Fine
T.	13	—.641	63	63	—	Ditto	—.633	63	63	—	Showery	.531	54	54	—	Clear & ditto
● W.	14	—.350	59	59	—	Rain	—.331	63	63	—	Heavy squall	—.424	51	51	—	Ditto
Th.	15	—.552	66	61	5	Dense clouds	—.603	63	52	11	Cloudy	—.744	56	56	—	Cloudy
F.	16	—.905	57	55	2	Very Fine	—.919	69	53	16	Very Fine	—.863	57	55	2	Ditto
S.	17	—.768	64	59	5	Cloudy & do.	—.829	64	53	11	Densely overcast	—.880	54	54	—	Clear
S.	18	30.060	58	53	5	Overcast & do.	30.083	66	46	20	Very Fine	30.092	54	52	2	Fine
M.	19	—.119	56	52	4	Clear	—.090	68	46	22	Ditto	—.041	62	60	2	Ditto
T.	20	29.901	67	67	—	Slightly overcast	29.768	75	65	10	Fine	29.774	55	53	2	Slightly overcast
☽ W.	21	—.744	68	62	6	Clear	—.747	64	49	15	Cloudy & do.	—.727	54	51	3	Ditto & fine
Th.	22	—.704	60	54	6	Fine	—.698	62	52	10	Heavy clouds	—.727	55	55	—	Ditto
F.	23	—.726	55	52	3	Overcast	—.697	67	47	20	Overcast	—.673	47	47	—	Clear & fine
S.	24	—.659	54	52	2	Clear	—.675	70	55	15	Cloudy & fine	—.746	54	52	2	Overcast
S.	25	—.902	59	57	2	Cloudy	—.924	70	54	16	Slightly clouded	—.976	53	50	3	Very Fine
M.	26	30.007	59	55	4	Fine	30.052	62	50	12	Cloudy	30.027	55	51	4	Cloudy & fine
T.	27	—.082	57	48	9	Overcast	—.078	68	45	23	Ditto & dry	—.080	46	44	2	Clear
☉ W.	28	—.137	51	49	2	Clear	—.110	67	44	23	Hot sun	—.113	44	44	—	Ditto & fine
Th.	29	—.138	55	55	—	Ditto	—.113	70	52	18	Cloudless	—.130	48	48	—	Ditto
F.	30	—.127	58	58	—	Ditto	—.135	67	62	5	Fine	—.182	48	48	—	Ditto
S.	31	—.293	60	55	5	Fine	—.289	73	57	16	Cloudless	—.278	49	49	—	Ditto
		29.793	59.81	56.55	3 26		29.795	67.29	54.54	12.75		29.811	52.74	51.58	1.16	

AUGUST.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	71	45	74	42	W	Strong	.02
2	72	49	85	45	—	Little	.11
3	69	52	84	48	SW	Strong	.15
4	77	44	91	41	W	Ditto	.01
5	72	57	83	57	S	Little	.37
6	71	52	81	48	SW	Strong	.02
7	71	50	84	46	—	Ditto	.12
8	72	47	83	45	W	Brisk	
9	74	45	87	41	SW	Ditto	
10	76	41	92	37	N	Little	
11	73	54	86	51	SW	Brisk	.12
12	70	54	72	52	W	Ditto	.33
13	65	51	69	48	SW	Little	.24
14	65	49	66	46	W	Boisterous	.30
15	68	47	74	43	NW	Strong	.03
16	77	57	82	57	W	Little	.01
17	69	47	75	46	—	Brisk	
18	69	43	77	39	NW	Little	
19	72	60	80	60	W	Brisk	.01
20	78	51	82	50	—	Ditto	
21	65	52	74	50	—	Little	
22	67	42	72	40	—	Ditto	
23	69	38	74	35	SW	Ditto	
24	71	49	78	46	—	Ditto	
25	73	50	81	48	NW	Brisk	
26	66	47	70	44	—	Little	
27	71	38	80	33	W	Ditto	
28	78	40	84	36	—	Ditto	
29	79	42	90	39	E	Ditto	
30	72	42	87	39	—	Brisk	
31	80	44	90	42	SE	Little	
	71.68	47.71	80.23	44.96			1.84

Remarks.

The mean temperature declined fully 2½ degrees below the average; but the weather on the whole was very favourable for bringing crops to maturity. The depth of rain was about half an inch below the average for this month. The barometer was low till the 15th, after which no rain fell with the exception of two slight showers; and towards the end of the month the barometer stood high. There was a heavy shower, with squall, at noon on the 7th; and on the 14th a very heavy squall commenced suddenly, and likewise at noon, with rain in torrents.

Mean Pressure from the 3 daily observations 29.799 inches.
—— Temperature.........Ditto...... 59°.94
—— Dew Point...........Ditto...... 54°.22
—— Degree of Dryness....Ditto...... 5°.72
—— Degree of Moisture...Ditto...... .811
—— Force of Vapour.....Ditto...... .416 inch.
Least observed degree of Moisture...... .444
Maximum Temperature in the Shade.... 80°.
Minimum Temperature in ditto........ 38°.
Maximum Temperature in the Sun ..... 92°.
Minimum of Terrestrial Radiation ..... 33°.
Mean Temperature of External Air ..... 59°.69

Winds.

North	1 days	N. East.....	0 days
South	1 ..	S. East......	1 ..
East........	2 ..	N. West	4 ..
West.......	14 ..	S. West.....	8 ..

31 days.

Amount of Rain .... 1.84 inches.

SEPTEMBER.

1844.	Days.	Morning. Barom.	Morning. Hygrometer.			Morning. Weather.	Noon. Barom.	Noon. Hygrometer.			Noon. Weather.	Night. Barom.	Night. Hygrometer.			Night. Weather.
S.	1	30.380	55	55	—	Slight fog	30.335	77	61	16	Clear and hot	30.335	50	50	—	Clear & fine
M.	2	—.322	58	58	—	Foggy	—.263	74	60	14	Ditto	—.192	54	51	3	Ditto
T.	3	—.097	62	62	—	Fine	—.050	69	60	9	Fine	—.020	62	60	2	Overcast
☾ W.	4	29.977	62	62	—	Densely overcast	29.954	73	63	10	Ditto	29.926	60	58	2	Ditto
Th.	5	—.842	66	66	—	Cloudy, mild	—.801	71	65	6	Cloudy, fine	—.926	56	56	—	Ditto
F.	6	—.837	65	65	—	Rain	—.884	70	64	6	Ditto	—.934	60	59	1	Do. & mild
S.	7	—.894	65	65	—	Slight rain	—.894	72	72	—	Ditto	—.913	58	56	2	Clear & fine
S.	8	—.873	63	63	—	Very fine	—.840	72	63	9	Clear & fine	—.759	60	60	—	Heavy rain
M.	9	—.717	59	59	—	Overcast	—.731	66	66	—	Densely clouded	—.747	56	56	—	Overcast
T.	10	—.820	57	57	—	Densely overcast	—.846	63	60	3	Slightly overcast	—.954	54	54	—	Fine
W.	11	30.014	52	52	—	Slight fog	—.995	64	47	17	Very fine	—.995	53	53	—	Clear & do.
● Th.	12	—.011	59	59	—	Overcast	30.037	66	53	13	Overcast, fine	30.089	55	55	—	Ditto
F.	13	—.159	60	60	—	Ditto	—.154	67	50	17	Very fine	—.138	56	54	2	Overcast, fine
S.	14	—.078	61	61	—	Do. & fine	—.056	72	57	15	Ditto	—.030	57	54	3	Ditto
S.	15	29.857	63	63	—	Overcast	29.825	70	64	6	Cloudy	29.830	60	60	—	Rain, hazy
M.	16	—.838	66	65	1	Very fine	—.838	71	65	6	Do. & fine	—.848	61	59	2	Clear & fine
T.	17	—.729	66	64	2	Overcast	—.708	70	70	—	Showery, cloudy	—.727	56	56	—	Hazy
W.	18	—.879	55	55	—	Rain	—.729	55	55	—	Rain	—.989	48	48	—	Fine
☽ Th.	19	30.068	51	51	—	Clear	—.933	62	50	12	Very fine	—.938	44	43	1	Very clear
F.	20	—.028	55	55	—	Drizzly	—.997	58	58	—	Hazy	—.997	44	44	—	Ditto
S.	21	—.048	54	54	—	Clear	30.068	64	57	7	Very fine	30.091	49	47	2	Ditto
S.	22	—.036	52	50	2	Fine	29.970	59	50	9	Cloudy & do.	29.921	49	47	2	Cloudy
M.	23	29.741	54	54	—	Cloudy	—.692	61	45	16	Ditto	—.729	51	49	2	Overcast
T.	24	—.893	53	50	3	Fine	—.944	63	53	10	Very fine	30.081	46	45	1	Clear & fine
W.	25	30.174	50	50	—	Slight fog	30.183	62	50	12	Ditto	—.234	44	44	—	Cloudy & do.
○ Th.	26	—.270	44	44	—	Foggy	—.245	63	53	10	Clear & fine	—.198	41	41	—	Clear & do.
F.	27	—.179	42	42	—	Ditto	—.132	62	59	3	Fine	—.096	42	42	—	Foggy
S.	28	—.047	43	43	—	Dense fog	29.987	64	53	11	Very fine	29.934	43	43	—	Clear
S.	29	29.961	52	52	—	Drizzly	20.040	58	54	4	Cloudy, fine	30.219	41	40	1	Ditto
M.	30	30.326	46	43	3	Slightly overcast	—.328	56	44	12	Clear & do.	—.242	40	40	—	Ditto
		30.003	56.33	55.97	0.36		29.981	65.80	57.37	8.43		30.001	51.67	50.80	0.87	

SEPTEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	84	44	94	40	SE	Little	
2	79	50	90	49	E	Brisk	
3	74	61	100	58	——	Ditto	
4	78	60	98	59	——	Ditto	.02
5	73	54	94	51	——	Little	.03
6	76	57	99	55	SW	Ditto	
7	77	55	95	54	——	Ditto	.01
8	79	55	111	54	SE	Ditto	.28
9	66	54	84	53	W	Ditto	.24
10	69	40	94	37	SW	Ditto	
11	73	44	102	40	N	Ditto	
12	70	51	86	51	W	Ditto	
13	73	51	96	49	SW	Ditto	
14	74	56	94	56	——	Brisk	.03
15	72	61	86	59	SE	Ditto	.05
16	73	61	84	60	W	Ditto	
17	72	53	83	49	SW	Ditto	.47
18	62	37	90	34	NE	Little	.11
19	65	42	91	39	——	Ditto	
20	66	40	83	36	E	Ditto	
21	64	47	82	46	NE	Brisk	.01
22	61	49	75	46	E	Ditto	
23	62	49	79	48	NE	Ditto	
24	65	39	83	36	——	Little	
25	65	35	89	33	——	Ditto	
26	72	36	90	31	SW	Ditto	
27	70	39	95	36	S	Ditto	
28	75	39	94	36	W	Ditto	.05
29	59	30	68	26	NE	Brisk	.01
30	67	31	90	27	SE	Little	
	70.50	47.33	89.97	44.93			1.31

Remarks.

The mean temperature, considerably depressed in the latter part of the preceding month, again rose above the average in the commencement of the present. The amount of rain was scarcely half the usual quantity. There was much sheet lightning on the evening of the 5th. On the 8th the thermometer exposed to the sun's rays was as high as 111°; and this high temperature was followed by thunder, lightning and heavy rain in the evening. On the evening of the 9th there were also lightning and heavy rain. The night of the 18th was 24° colder than that of the 16th. Frost was experienced on the nights of the 29th and 30th.

Mean Pressure from the 3 daily observations		29.995 inches.
—— Temperature	Ditto	57°.93
—— Dew Point	Ditto	54°.71
—— Degree of Dryness	Ditto	3°.22
—— Degree of Moisture	Ditto	.872
—— Force of Vapour	Ditto	.427 inch.
Least observed degree of Moisture		.549
Maximum Temperature in the Shade		84°.
Minimum Temperature in ditto		30°.
Maximum Temperature in the Sun		111°.
Minimum of Terrestrial Radiation		26°.
Mean Temperature of External Air		58°.91

Winds.

North...... 1 days	N. East ....7 days
South.......1 ..	S. East ....4 ..
East........6 ..	N. West....0 ..
West...... 4 ..	S. West ....7 ..

30 days.

Amount of Rain.................. 1.31 inches.

OCTOBER.

1844.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
T.	1	30.109	45	45	—	Clear	30.019	64	53	11	Cloudy	29.962	55	55	—	Overcast
W.	2	29.671	57	57	—	Densely clouded	29.561	67	63	4	Ditto	—.795	53	51	2	Clear
Th.	3	—.793	59	59	—	Overcast	—.758	65	63	2	Boisterous	—.830	56	53	2	Ditto
☾ F.	4	—.958	49	49	—	Very clear	—.959	62	47	15	Very Fine	—.871	49	47	2	Cloudy, fine
S.	5	—.756	58	55	3	Fine	—.686	63	55	8	Ditto	—.802	47	47	—	Rain
S.	6	—.986	55	55	—	Overcast	—.967	56	49	7	Clear & ditto	—.896	47	47	—	Overcast
M.	7	—.872	47	47	—	Fine	—.922	55	45	10	Very Fine	—.997	39	39	—	Frosty
T.	8	—.946	37	37	—	Foggy	—.704	58	47	11	Ditto	—.568	43	43	—	Clear
W.	9	—.291	50	50	—	Slightly overcast	—.175	58	55	3	Cloudy	—.025	59	59	—	Boisterous
Th.	10	—.194	57	57	—	Dusky clouds	—.250	63	63	—	Do. and mild	—.440	47	47	—	Clear & fine
● F.	11	—.623	45	45	—	Heavy dew	—.661	62	52	10	Very Fine	—.741	49	49	—	Ditto
S.	12	—.724	50	50	—	Foggy	—.647	64	60	4	Ditto	—.540	56	56	—	Showery
S.	13	—.409	59	59	—	Cloudy	—.348	63	58	5	Overcast	—.217	52	52	—	Lightning
M.	14	—.322	50	50	—	Showery	—.221	56	56	—	Rain	28.987	50	50	—	Rain
T.	15	—.018	51	51	—	Heavy showers	28.990	60	60	—	Heavy showers	—.940	51	51	—	Ditto
W.	16	28.940	48	48	—	Rain	29.020	54	54	—	Ditto	29.096	43	43	—	Clear & fine
Th.	17	29.232	51	51	—	Fine	—.290	56	53	3	Fine	—.450	44	44	—	Ditto
☽ F.	18	—.618	44	44	—	Clear	—.707	55	50	5	Ditto	—.779	40	40	—	Ditto
S.	19	—.782	40	40	—	Slight haze	—.715	54	45	9	Cloudy	—.577	49	49	—	Cloudy
S.	20	—.460	52	52	—	Fine	—.416	54	50	4	Do. and fine	—.460	38	38	—	Clear & fine
M.	21	—.510	46	46	—	Overcast	—.521	49	49	—	Hazy	—.601	42	42	—	Heavy rain
T.	22	—.766	46	46	—	Rain	—.823	55	55	—	Cloudy	—.897	35	35	—	Frosty
W.	23	—.912	34	34	—	Dense fog	—.863	43	43	—	Foggy	—.771	47	47	—	Showery
Th.	24	—.706	50	50	—	Cloudy	—.697	52	52	—	Rain	—.671	48	48	—	Rain
F.	25	—.760	47	47	—	Rain	—.800	52	52	—	Densely clouded	—.853	41	41	—	Clear & fine
○ S.	26	—.917	45	45	—	Overcast	—.965	51	50	1	Overcast	30.096	43	43	—	Ditto
S.	27	30.252	48	48	—	Ditto	30.247	53	45	8	Ditto & fine	—.237	44	44	—	Overcast
M.	28	—.209	37	37	—	Foggy	—.166	46	46	—	Foggy	—.129	35	35	—	Foggy
T.	29	—.053	45	45	—	Overcast	29.999	52	48	4	Cold haze	29.912	42	42	—	Overcast
W.	30	29.818	43	43	—	Drizzly	—.808	45	45	—	Ditto	—.821	43	43	—	Ditto
Th.	31	—.812	40	40	—	Foggy	—.737	52	52	—	Fine	—.687	44	44	—	Clear
		29.690	47.90	47.81	0.09		29.666	56.09	52.09	4.00		29.666	46.13	45.94	0.19	

OCTOBER.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	70	45	92	43	SW	Little	
2	70	47	80	44	W	Strong	
3	71	41	85	37	SW	Ditto	
4	69	46	88	44	——	Little	
5	67	39	79	37	——	B isk	.22
6	63	40	78	37	——	Ditto	
7	62	29	79	27	NW	Little	
8	61	41	77	38	S	Ditto	
9	63	53	74	50	SE	Brisk	.01
10	63	35	74	33	SW	Ditto	.07
11	68	39	88	36	——	Little	
12	64	55	79	54	S	Brisk	.03
13	65	45	79	43	SW	Ditto	.33
14	65	44	77	44	S	Brisk	.42
15	63	46	70	46	SW	Ditto	1.04
16	60	43	76	40	W	Little	.02
17	59	37	68	34	——	Ditto	
18	56	33	69	30	——	Ditto	
19	58	42	73	40	SW	Brisk	.03
20	59	34	74	34	——	Ditto	.03
21	59	43	59	42	E	Little	.64
22	59	30	61	26	W	Ditto	.04
23	58	39	64	37	N	Ditto	.04
24	52	46	52	46	——	Ditto	.88
25	52	40	55	39	——	Ditto	.03
26	53	37	56	35	——	Ditto	
27	53	29	56	28	NE	Ditto	
28	47	31	55	27	——	Ditto	
29	52	42	59	40	E	Ditto	.28
30	48	34	60	30	——	Ditto	.02
31	54	43	70	40	——	Ditto	
	60.09	40.26	71.16	38.09			4.13

Remarks.

The average temperature was still maintained; and there was likewise abundance of moisture. The quantity of rain which fell between the 1st of April and the commencement of this month was 6 inches $\frac{8}{10}$; whereas the average for the same period is 12 inches $\frac{6}{10}$; and deducting $1\frac{1}{2}$ inch, the excess above the average for October, there remained about 11 inches of rain still due at the end of the month. Nearly as much fell on the 14th and 15th as there did in the months of April, May, and June of the present year. The barometer averaged very low; the greatest depression being about the middle of the month when the great fall of rain took place. Previously to this, it was found that in borders not watered the soil was dry to the depth of a trench, $2\frac{1}{2}$ feet deep.

Mean Pressure from the 3 daily observations 29.674 inches
—— Temperature .... Ditto ...... 50°.04
—— Dew Point .... Ditto ...... 48°.61
—— Degree of Dryness ... Ditto ...... 1°.43
—— Degree of Moisture ... Ditto ...... .950
—— Force of Vapour ..... Ditto ...... .343 inch.
Least observed degree of Moisture ...... .588
Maximum Temperature in the Shade .... 71°.
Minimum Temperature in ditto .... 29°.
Maximum Temperature in the Sun ...... 92°.
Minimum of Terrestrial Radiation ...... 27°.
Mean Temperature of External Air ..... 50°.17

Winds.

North.......4 days.	N. East......2 days.
South...... 3 ..	S. East ......1 ..
East.........4 ..	N. West.....1 ..
West........5 ..	S. West.....11 ..

31 days.

Amount of Rain................4.13 inches.

NOVEMBER.

		Morning.					Noon.					Night.				
1844.	Days.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.	Barom.	Hygrometer.			Weather.
F.	1	29.513	47	47	—	Hazy	29.391	48	48	—	Overcast	29.248	45	45	—	Boisterous
S.	2	—.119	44	44	—	Constant rain	—.155	44	44	—	Rain	—.245	42	42	—	Ditto
☾ S.	3	—.318	40	40	—	Cloudy	—.328	42	42	—	Cloudy & fine	—.384	39	39	—	Densely clouded
M.	4	—.371	41	41	—	Overcast	—.312	46	46	—	Cloudy	—.215	41	41	—	Clear
T.	5	—.185	40	40	—	Ditto	—.175	45	45	—	Ditto	—.215	39	39	—	Hazy
W.	6	—.267	38	38	—	Ditto	—.252	45	45	—	Overcast	—.276	36	36	—	Overcast
Th.	7	—.377	41	41	—	Rain	—.372	48	48	—	Cloudy	—.364	46	46	—	Ditto
F.	8	—.096	46	46	—	Overcast	—.030	54	54	—	Ditto	28.937	49	49	—	Heavy rain
S.	9	28.979	46	46	—	Hazy clouds	28.947	54	54	—	Fine	29.077	41	41	—	Clear
● S.	10	29.194	40	40	—	Clear & fine	—.919	48	48	—	Rain	28.965	37	37	—	Rain
M.	11	—.177	40	40	—	Fine	29.401	47	47	—	Densely clouded	29.495	42	42	—	Ditto
T.	12	—.421	48	48	—	Rain	—.417	52	52	—	Drizzly	—.503	53	53	—	Do. boisterous
W.	13	—.555	55	55	—	Heavy ditto	—.506	55	55	—	Heavy rain	—.828	45	45	—	Clear & Fine
Th.	14	30.012	44	44	—	Hazy, rain	30.063	51	51	—	Drizzly	30.109	51	51	—	Rain
F.	15	—.078	54	54	—	Densely clouded	—.025	58	56	2	Cloudy	—.076	53	53	—	Overcast
S.	16	—.191	51	51	—	Hazy	—.207	58	58	—	Hazy	—.237	45	45	—	Clear
☽ S.	17	—.296	52	52	—	Foggy	—.293	54	52	2	Overcast	—.280	48	48	—	Hazy
M.	18	—.258	52	52	—	Overcast	—.217	52	52	—	Ditto	—.178	50	50	—	Overcast
T.	19	—.177	50	50	—	Ditto	—.162	51	51	—	Hazy	—.143	48	48	—	Ditto
W.	20	—.111	48	48	—	Hazy	—.123	54	54	—	Overcast	—.204	45	45	—	Clear & Fine
Th.	21	—.304	38	38	—	Foggy	—.301	45	45	—	Foggy	—.291	33	33	—	Dense fog
F.	22	—.246	34	34	—	Hazy	—.230	44	44	—	Hazy	—.185	41	41	—	Overcast
S.	23	—.146	40	40	—	Ditto	—.136	44	44	—	Foggy	—.124	34	34	—	Ditto
○ S.	24	—.031	40	40	—	Ditto	29.983	42	40	2	Cloudy, fine	29.947	39	39	—	Cloudy
M.	25	29.983	38	38	—	Overcast	30.102	43	43	—	Ditto	30.089	39	39	—	Ditto
T.	26	30.221	29	29	—	Clear & frosty	—.245	42	40	2	Fine	—.296	27	27	—	Clear & frosty
W.	27	—.326	26	26	—	Sharp frost	—.298	40	40	—	Foggy	—.237	28	28	—	Ditto
Th.	28	—.110	33	33	—	Foggy	—.065	42	40	2	Cloudy	29.986	39	39	—	Uniformly overcast
Fr.	29	29.958	39	39	—	Easterly haze	29.998	40	40	—	Foggy	30.038	38	38	—	Densely clouded
S.	30	30.099	38	38	—	Overcast	30.073	40	40	—	Overcast	—.079	34	34	—	Cloudy
		29.770	42.40	42.40	0.0		29.758	47.60	47.27	0.33		29.775	41.57	41.57	0.0	

NOVEMBER.

	Temperature.				Wind.		Rain.
Days.	Max.	Min.	Sun.	Rad.	Direction.	Force.	In. Pts.
1	50	40	51	38	E	Brisk	.38
2	47	37	47	36	——	Little	.49
3	45	37	45	35	NE	Ditto	
4	48	27	54	24	NW	Brisk	
5	49	34	57	32	N	Little	.03
6	48	30	58	27	SW	Ditto	
7	51	44	53	43	SE	Ditto	.06
8	57	42	65	42	——	Ditto	.58
9	56	35	58	32	W	Ditto	
10	54	35	58	32	S	Ditto	.34
11	50	37	56	34	W	Brisk	.16
12	58	48	58	46	SW	Little	.50
13	57	37	57	36	——	Brisk	.38
14	55	49	55	49	——	Little	.12
15	59	45	63	45	——	Brisk	
16	60	43	61	41	——	Little	
17	56	44	56	41	——	Ditto	
18	55	51	56	48	——	Ditto	
19	55	47	55	45	S	Ditto	
20	59	30	58	27	SW	Ditto	
21	49	30	49	28	——	Ditto	.02
22	45	39	47	37	W	Ditto	
23	45	28	47	25	E	Ditto	
24	44	31	45	28	NE	Ditto	
25	45	29	55	24	N	Ditto	
26	45	22	62	17	SW	Ditto	
27	46	23	48	20	——	Ditto	
28	44	38	44	36	SE	Ditto	
29	44	37	48	36	E	Ditto	
30	40	30	44	25	NE	Ditto	
	50.53	36.63	53.67	34.30			3.06

Remarks.

The mean temperature was a little above the average. The amount of rain was nearly half an inch above the usual quantity for the month, although none fell after the 14th with the exception of a slight deposition on the 21st. The air, except in a very few instances, was constantly saturated with moisture. Damp as the months of November usually prove, the present exceeded every one in that respect, for at least 18 previous years. Sharp frosts occurred on the nights of the 26th and 27th.

Mean Pressure from the 3 daily observations 29.767 inches
—— Temperature..........Ditto...... 43°.85
—— Dew Point............Ditto...... 43°.74
—— Degree of Dryness......Ditto...... 0°.11
—— Degree of Moisture.....Ditto...... .996
—— Force of Vapour.......Ditto...... .287 inch.
Least observed degree of Moisture........ .926
Maximum Temperature in the Shade...... 60°.
Minimum Temperature in ditto.. .... 22°.
Maximum Temperature in the Sun........ 65°.
Minimum of Terrestrial Radiation........ 17°.
Mean Temperature of External Air....... 43°.58

Winds.

North........2 days	N. East ......3 days
South .... 2 ..	S. East.......3 ..
East ....4 ..	N. West ......1 .
West ....3 ..	S. West .....12 ..

30 days.

Amount of Rain ....3.06 inches.

DECEMBER.

1844.	Days.	Morning. Barom.	Hygrometer.			Weather.	Noon. Barom.	Hygrometer.			Weather.	Night. Barom.	Hygrometer.			Weather.
S.	1	30.123	36	36	—	Overcast	30.091	40	37	3	Cloudy	30.083	35	35	—	Overcast
M.	2	—.053	36	36	—	Ditto	29.998	40	35	5	Overcast	—.005	35	35	—	Ditto
☾ T.	3	—.043	35	35	—	Ditto	30.041	40	36	4	Ditto & cold	—.073	35	35	—	Ditto
W.	4	—.223	35	30	5	Cloudy & cold	—.205	38	35	3	Cloudy, Ditto	—.169	32	32	—	Frosty
Th.	5	—.111	26	26	—	Sharp Frost	—.069	33	33	—	Frosty	—.095	22	22	—	Severe Frost
F.	6	—.203	19	19	—	Severe Ditto	—.208	29	29	—	Do. & Foggy	—.216	18	18	—	Ditto
S.	7	—.292	29	29	—	Slight Ditto	—.292	32	32	—	Hazy	—.294	26	26	—	Slight Frost
S.	8	—.172	30	25	5	Dry & frosty	—.104	33	28	5	Overcast	—.058	28	28	—	Sleet
● M.	9	—.104	28	24	4	Overcast,	—.114	30	25	5	Ditto	—.119	29	29	—	Overcast
T.	10	—.104	31	25	6	Do. Cold and Dry	—.079	31	25	6	Ditto	—.044	30	28	2	Ditto
W.	11	29.962	29	29	—	Hazy	29.952	29	26	3	Dusky Haze	29.959	25	25	—	Clear & frosty
Th.	12	—.924	28	28	—	Foggy	—.885	31	25	6	Overcast	—.750	25	25	—	Overcast do.
F.	13	—.545	25	23	2	Thick Haze	—.500	26	26	—	Ditto	—.443	27	27	—	Ditto
S.	14	—.430	28	25	3	Hazy	—.457	31	31	—	Ditto	—.523	28	28	—	Densely overcast
S.	15	—.556	35	35	—	Slight thaw	—.530	38	38	—	Ditto	—.436	37	37	—	Foggy
☽ M.	16	—.326	37	37	—	Hazy	—.316	39	39	—	Foggy	—.336	38	38	—	Ditto
T.	17	—.365	38	38	—	Dense fog	—.375	44	44	—	Ditto	—.434	39	39	—	Overcast
W.	18	—.581	40	40	—	Foggy	—.627	43	43	—	Ditto	—.806	41	41	—	Fine
Th.	19	30.025	42	42	—	Drizzly	30.088	42	42	—	Hazy	30.214	36	36	—	Boisterous
F.	20	—.260	34	32	2	Overcast	—.270	35	28	7	Clear and cold	—.288	31	31	—	Ditto
S.	21	—.298	32	25	7	Cold and Dry	—.462	35	30	5	Overcast & do.	—.295	34	34	—	Cloudy & Do.
S.	22	—.239	32	26	6	Ditto	—.203	34	25	9	Ditto	—.176	32	29	3	Overcast
M.	23	—.190	30	24	6	Cloudy	—.095	34	25	9	Ditto	—.238	30	30	—	Ditto
○ T.	24	—.270	32	25	7	Cold Haze	—.252	33	25	8	Hazy	—.245	34	34	—	Ditto
W.	25	—.260	32	32	—	Densely overcast	—.223	34	30	4	Overcast	—.194	34	34	—	Ditto
Th.	26	—.116	34	34	—	Dense fog	—.073	38	38	—	Foggy	—.072	35	35	—	Very Foggy
F.	27	—.038	32	32	—	Ditto	—.036	33	33	—	Dense fog	29.998	34	34	—	Ditto
S.	28	29.944	40	40	—	Fine	29.914	45	45	—	Overcast	—.906	44	44	—	Drizzly
S.	29	—.910	45	45	—	Drizzly	—.920	45	45	—	Ditto	—.932	40	40	—	Rain
M.	30	—.951	40	40	—	Foggy	—.959	38	38	—	Foggy	30.008	37	37	—	Overcast
T.	31	30.086	38	38	—	Ditto	30.067	41	41	—	Hazy	—.105	39	39	—	Ditto
		29.990	33.16	31.45	1.71		29.981	35.93	33 29	2.64		29.984	32.58	32.42	0.16	

DECEMBER.

Days.	Temperature. Max.	Min.	Sun.	Rad.	Wind. Direction.	Force.	Rain. In. Pts.
1	42	33	55	32	NE	Brisk	
2	40	27	41	25	——	Little	
3	39	33	39	32	——	Ditto	
4	40	22	40	17	——	Ditto	
5	35	14	39	8	——	Ditto	
6	30	14	30	9	E	Ditto	
7	34	20	34	15	——	Little	
8	32	26	33	25	NE	Brisk	
9	32	28	32	26	——	Ditto	
10	32	28	32	26	——	Ditto	
11	30	22	33	17	——	Little	
12	31	24	32	22	E	Ditto	
13	32	25	32	23	——	Brisk	
14	32	28	33	25	——	Little	
15	40	34	40	32	——	Ditto	.03
16	43	35	45	35	——	Ditto	
17	44	35	45	34	——	Ditto	
18	44	40	44	40	NE	Ditto	.05
19	42	29	42	27	E	Ditto	.01
20	38	28	49	24	NE	Brisk	
21	37	30	37	27	——	Ditto	
22	35	27	35	23	——	Ditto	
23	34	28	33	25	——	Little	
24	34	31	34	29	E	Ditto	
25	35	31	35	30	——	Ditto	
26	39	30	39	30	SE	Ditto	
27	38	30	41	30	NE	Ditto	
28	48	42	48	40	SE	Ditto	.15
29	49	38	50	38	——	Ditto	.15
30	42	32	42	30	NE	Ditto	
31	44	32	44	30	——	Ditto	
	37.64	28.90	38.97	2664			0.39

Remarks.

This month was one of continued severity. The mean temperature was 7° below the average So early in the month as the 5th and 6th the thermometer fell 18° below freezing. Frost continued till the 14th, when it was found to have penetrated to the depth of 8 inches in Kitchen Garden soil; but where the ground had been recently dug the frozen crust was only 6 inches thick. The wind was wholly from East, South East or North East, but chiefly from the latter Dense fogs were of frequent occurrence. The nights of the 19th and 20th were boisterous

Mean Pressure from the 3 daily observations 29985 inches
—— Temperature ....Ditto...... 33°89
— Dew Point ....Ditto...... 32°39
—— Degree of Dryness ....Ditto...... 1°50
—— Degree of Moisture .....Ditto...... 930
—— Force of Vapour........Ditto...... 187 inch
Least observed degree of Moisture 705
Maximum Temperature in the Shade...... 49°
Minimum Temperature in ditto.......... 14°
Maximum Temperature in the Sun........ 55°
Minimum of Terrestrial Radiation........ 8°
Mean Temperature of External Air....... 33°27

Winds.

North..........	0 days	N East	17 days
South..........	0 ..	S East..........	3 ..
East..........	11 ..	N West	0 ..
West	0 ..	S West	0 ..

31 days

Amount of Rain ....039 inches

Monthly Mean Pressure, Temperature, and Dew Point, &c. of 1844; deduced from the Observations recorded in the preceding Journal.

1844.	Pressure.								Temperature.											
					Mean at			Mean of the three Observations.	In the Shade.			Mean at			Mean of the three Observs	In Sun's Rays.		Terrestrial Radiation.		Med. of Sun and Radn.
Months.	Max.	Min.	Med.	Range of Barom.	Morn.	Noon.	Night.		Max.	Min.	Med.	Morn.	Noon.	Night.		Max.	Min.	Max.	Min.	
Jan. .	30.346	29.199	29.969	1.147	29.961	29.967	29.976	29.968	54	14	38.79	37.35	43.67	37.39	39.47	61	39	42	3	39.20
Feb. .	30.171	28.624	29.608	1.547	29.584	29.599	29.610	29.597	53	19	36.49	33.37	41.17	34.17	36.23	61	38	41	12	38.17
March	30.505	29.240	29.806	1.265	29.794	29.785	29.818	29.799	63	19	42.46	41.35	48.29	38.35	42.66	72	48	43	13	43.80
April	30.441	29.588	30.097	0.853	30.108	30.097	30.086	30.097	73	25	51.06	50.30	62.60	46.90	53.26	84	62	46	20	53.05
May .	30.432	29.791	30.070	0.641	30.082	30.059	30.063	30.068	78	32	54.05	54.06	63.13	47.16	54.78	90	66	50	24	57.86
June.	30.179	29.613	29.939	0.566	29.950	29.929	29.929	29.936	91	40	62.95	62.30	70.57	54.23	62.37	106	70	62	36	68.23
July .	30.275	29.474	29.885	0.801	29.897	29.878	29.876	29.883	92	42	64.30	63.67	70.38	57.10	63.71	108	66	59	37	69.22
Aug.	30.293	29.331	29.801	0.962	29.79[illegible]	29.795	29.811	29.799	80	38	59.69	59.81	67.29	52.74	59.94	92	66	57	33	62.59
Sept.	30.380	29.692	29.997	0.688	30.003	92.981	30.001	29.995	84	30	58.91	56.38	65.80	51.67	57.93	111	75	60	26	67.47
Oct. .	30.252	28.940	29.683	1.312	29.690	29.666	29.666	29.674	71	29	43.58	47.90	56.09	46.13	50.04	92	52	54	27	54.62
Nov. .	30.326	28.937	29.769	1.389	29.770	29.758	29.775	29.767	60	22	43.58	42.40	47.60	41.57	43.35	65	44	49	17	43.98
Dec. .	30.462	29.430	29.985	1.032	29.990	29.981	29.984	29.985	49	14	32.27	33.16	35.93	32.58	33.89	55	32	40	8	32.80
Aver.	30.338	29.321	29.884	1.017	29.885	29.874	29.883	29.880	70.66	27.00	49.09	48.50	56.04	45.00	48.84	83.08	54.83	50.25	21.33	52.58

1844.	Hygrometer indicating Dew Point.								Scale of the Winds.									Rain.
	Mean Dew Point at			Mean Dew Point.	Mean Force of Vapour.	Mean degree of Dryness.	Mean degree of Moisture.	Least degree of Moisture.										
Months.	Morn.	Noon.	Night.						N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Days.	In. Pts.
Jan. .	36.74	41.16	37.39	38.43	.236	1.04	914	660	5	4	0	1	0	9	8	4	31	2.25
Feb. .	32.65	37.55	34.17	34.79	.206	1.44	949	652	3	0	2	1	2	8	6	7	29	2.27
March	46.26	42.94	38.35	40.51	.255	2.15	923	526	5	5	3	0	1	9	7	1	31	2.44
April	45.87	44.70	45.07	45.21	.302	8.05	743	312	3	4	4	0	2	9	6	2	30	0.33
May .	48.93	46.97	43.97	46.62	.319	8.16	745	337	1	22	6	0	0	1	1	0	31	0.25
June.	55.97	54.17	50.93	53.69	.412	8.68	740	355	2	3	2	0	2	13	6	2	30	0.97
July .	59.35	57.87	55.39	57.53	.472	6.18	781	389	5	1	3	1	3	7	7	4	31	2.10
Aug.	56.55	54.54	51.58	53.95	.416	3.72	811	444	1	0	2	1	1	8	14	4	31	1.84
Sept.	55.97	57.37	50.80	54.71	.427	3.22	872	549	1	7	6	4	1	7	4	0	30	1.31
Oct.	47.81	52.09	45.94	48.61	.343	1.43	950	588	4	2	4	1	3	11	5	1	31	4.13
Nov.	42.40	47.27	41.57	43.74	.287	0.11	996	926	2	3	4	3	2	12	3	1	30	3.06
Dec. .	31.45	33.29	32.42	32.39	.187	1.50	930	705	0	17	11	3	0	0	0	0	31	0.39
Aver.	46.16	47.49	43.96	45.85	.321	3.97	863	537	32	68	47	15	17	94	67	26	366	21.34

GENERAL INDEX

TO THE

FIRST AND SECOND SERIES

OF THE

TRANSACTIONS OF THE HORTICULTURAL SOCIETY OF LONDON.

_ The Roman numerals indicate the respective Volumes; the First Series is to be understood, unless the references are preceded by 2 S., when the Second Series is denoted.

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